

Does age moderate self-pain enmeshment in chronic pain patients?

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## ABSTRACT

Research has demonstrated that chronic pain can compromise identity by becoming enmeshed and centralised with pain. Pain-identity enmeshment and pain-identity centrality are associated with greater affective distress and poorer chronic pain adjustment. However, the literature infers differences between older and younger individuals in terms of pain adjustment, whereby older adults perceive pain as concomitant of aging and experience this as less biographically disruptive and perceive themselves to be younger than their chronological age, which is associated with greater psychological wellbeing. Research has yet to explore the relationship between perceived age and pain-identity enmeshment and adjustment in chronic pain. The purpose of this research was to investigate age in relation to pain-identity enmeshment and centrality and to examine the predictive value of age in pain adjustment.

90 patients with osteoarthritis (OA) and chronic pain were recruited from a musculoskeletal service. Participants completed standardised measures of pain intensity and perceived control (VAS), pain severity and interference (BPI), acceptance (CPAQ), identity (CES, Possible Selves Interviews), affective distress (HADS), and catastrophising (PCS) and provided information regarding their perceived age. Statistical analysis included; correlation, chi square, analysis of variance and linear regression to investigate potential age differences.

Chronological age evidenced few significant relationships with variables of pain adjustment and identity. Perceived age evidenced significant relationships with all variables of adjustment and identity, however, did not statistically predict chronic pain adjustment. However, hoped-for proximity and centrality significantly predicted chronic pain adjustment. *The CES* demonstrated significant relatedness to enmeshment, although effect sizes were small. Therefore, it appears possible that an individual may experience pain becoming central to their identity yet remain un-enmeshed with pain.

These findings indicate the necessity to assess hoped-for proximity and centrality in chronic pain populations across all age groups. This research indicates the potential for incorrectly perceiving expectedness and adjustment ease in old age. The implications of these findings are explored, in conjunction with the limitations of this research and potential areas for further research.

## CONTENTS PAGE

TITLE PAGE .....	1
INTEGRITY STATEMENT .....	2
ACKNOWLEDGEMENTS .....	3
ABSTRACT .....	4
CONTENTS PAGE .....	5
LIST OF FIGURES .....	8
LIST OF TABLES .....	9
ABBREVIATIONS .....	10
CHAPTER 1: LITERATURE REVIEW .....	11
<b>1.2 Introduction</b> .....	11
1.2.1 When can pain be considered abnormal? .....	12
1.2.2 The psychological impact of pain .....	14
<b>1.3 Age difference and Pain</b> .....	15
1.3.1 Prevalence .....	15
1.3.2 Pain Perception .....	16
1.3.3 Perceived Control .....	19
1.3.4 Catastrophising .....	20
1.3.5 Acceptance .....	21
<b>1.4 Pain and Identity</b> .....	22
1.4.1 Introduction.....	22
1.4.2 Biographical Disruption.....	23
1.4.3 Developmental losses and gains over the lifespan .....	24
<b>1.5 Perceived or felt age</b> .....	26
1.5.1 Feeling younger as self-enhancing.....	27
1.5.2 Self-Discrepancy Theory .....	29
1.5.3 Possible Selves .....	31
1.5.4 Identity Enmeshment .....	33
1.5.5 Centrality – When pain becomes integrated into identity... ..	35
<b>1.6 Measuring Identity Enmeshment and Centrality</b> .....	37
1.6.1 Possible Selves Interview .....	37
1.6.2 Centrality of Event Scale .....	38
<b>1.7 Summary &amp; Research Aims</b> .....	39
1.7.1 Summary.....	39
1.7.2 Research Aims .....	40
1.7.3 Research Hypotheses .....	41
CHAPTER TWO: METHOD .....	42
<b>2.1 Sample Selection</b> .....	42
<b>2.2 Study Design</b> .....	43
2.3.1 Ethical Approval .....	43
2.3.2 Additional Research Caveat .....	43
<b>2.3 Participant Selection</b> .....	44
2.4.1 Inclusion Criteria .....	44
2.4.2 Exclusion Criteria .....	44
<b>2.4 Study Measures</b> .....	44
2.5.1 Demographic Information .....	44
<b>2.5 Identity Measures</b> .....	45
2.6.1 Centrality of Event Scale .....	45
2.6.2 Possible Selves Interview.....	45
2.6.3 Feared-for Selves Interview .....	45
2.6.4 Hoped-for Selves Interview .....	47
<b>2.6 Pain Measures</b> .....	48
2.7.1 Locus of Control VAS .....	48
2.7.2 Pain Catastrophising Scale .....	48
2.7.3 Chronic Pain Acceptance Questionnaire .....	49
2.7.4 The Brief Pain Inventory.....	49

2.7.5 Pain Intensity VAS .....	49
<b>2.7 Affective Measurement</b> .....	50
2.8.1 The Hospital Anxiety and Depression Scale .....	50
<b>2.8 Perceived Age</b> .....	50
<b>2.9 Schedule of Administration</b> .....	50
<b>2.10 Procedure</b> .....	51
CHAPTER THREE: RESULTS .....	53
<b>3.1 Introduction</b> .....	53
3.1.1 Testing for normal distribution .....	53
<b>3.2 The Sample</b> .....	53
3.2.1 Demographic Data .....	53
3.2.2 Education Level .....	54
3.2.3 Diagnosis .....	54
3.2.4 Pain Site(s).....	55
3.2.5 Pain Treatments Received .....	55
<b>3.3 Age</b> .....	56
3.3.1 Chronological Age .....	56
3.3.2 Perceived Age .....	57
3.3.3 Age Discrepancy .....	57
<b>3.4 Pain Measurement</b> .....	58
3.4.1 Pain Duration and Diagnosis .....	58
3.4.2 Pain Intensity and Severity .....	59
3.4.3 Pain Relief .....	59
3.4.4 Pain Interference.....	59
3.4.5 Pain Acceptance.....	60
3.4.6 Pain Catastrophising.....	60
3.4.7 Affective Disturbance .....	60
3.4.8 Perceived Control .....	61
3.4.9 Correlation Data .....	61
<b>3.5 Identity Measurement</b> .....	61
3.5.1 The Feared-for Self .....	62
3.5.2 The Hoped-for Self .....	63
3.5.3 Centrality .....	65
<b>3.6 The Relationship between Chronological and Perceived Age</b> .....	65
3.6.1 Age Perception .....	65
<b>3.7 Age and the self (Centrality, Enmeshment and Proximity)</b> .....	67
<b>3.8 Age, Self-Efficacy and Perceived Expectancy</b> .....	68
<b>3.9 The inter-relationship between Centrality and Enmeshment</b> .....	69
3.9.1 Centrality and Feared-for Enmeshment .....	70
3.9.2 Centrality and Hoped-for Enmeshment .....	72
<b>3.10 Self-discrepancy, Centrality and Adjustment</b> .....	74
<b>3.11 Expectation, Self-Efficacy and Adjustment</b> .....	75
<b>3.12 Age and Adjustment</b> .....	75
3.12.1 Multiple Regression Analyses .....	76
3.12.2 Selecting Predictor Variables .....	77
3.12.3 Checking Assumptions .....	77
3.12.4 Predicting Adjustment – Centrality, Feared-for Enmeshment & Proximity.....	78
3.12.5 Predicting Adjustment – Centrality, Hoped-for Enmeshment & Proximity .....	78
CHAPTER FOUR: DISCUSSION.....	80
<b>4.1 Introduction</b> .....	80
<b>4.2 Perceived Age vs. Chronological Age</b> .....	80
<b>4.3 Age and Adjustment</b> .....	81
<b>4.4 Age Self-Discrepancy and Centrality</b> .....	83
<b>4.5 Perceived Age as a Predictor of Chronic Pain Adjustment</b> .....	84
<b>4.6 Identity and Adjustment</b> .....	85

4.6.1 Chronic Pain Adjustment .....	85
4.6.2 Adjustment and Centrality .....	86
4.6.3 Adjustment and The Feared-for Self .....	87
4.6.4 Adjustment and The Hoped-for Self .....	88
<b>4.7 The inter-relatedness of Centrality and Enmeshment .....</b>	<b>89</b>
<b>4.8 Study Limitations .....</b>	<b>91</b>
4.8.1 Recruitment and Participants .....	91
4.8.2 Demographics .....	92
4.8.3 Pain Measures .....	92
4.8.4 Affect Measures .....	92
4.8.5 Identity Measures .....	93
4.8.6 Study Design, Causality and Normal Distribution .....	94
4.8.7 Demand Characteristics .....	95
<b>4.9 Clinical Implications .....</b>	<b>95</b>
4.9.1 Psychological Interventions .....	96
4.9.2 Cognitive Behavioural Interventions .....	97
4.9.3 Acceptance and Commitment Therapy .....	98
4.9.4 Clinical Application .....	100
<b>4.10 Future Research .....</b>	<b>100</b>
REFERENCES .....	102
APPENDICES .....	128
<b>Appendix 1:</b> Letter: Ethical Approval Confirmation .....	128
<b>Appendix 2:</b> Informed Consent Form.....	134
<b>Appendix 3:</b> Participant Information Sheet .....	135
<b>Appendix 4:</b> Chronic Pain Acceptance Questionnaire (CPAQ) .....	137
<b>Appendix 5:</b> Hospital Anxiety and Depression Scale (HADS) .....	138
<b>Appendix 6:</b> Feared-for Self Interview .....	139
<b>Appendix 7:</b> Hoped-for Self Interview .....	141
<b>Appendix 8:</b> Brief Pain Inventory (Short Version).....	143
<b>Appendix 9:</b> The Centrality of Event Scale.....	145
<b>Appendix 10:</b> Visual Analogue Scales.....	146
<b>Appendix 11:</b> The Pain Catastrophising Scale .....	147
<b>Appendix 12:</b> Correlation Data .....	148

## LIST OF FIGURES

- Figure 1:** The Dual Processing Model
- Figure 2:** The Perceptual Control Model
- Figure 3:** Schema Enmeshment Model
- Figure 4:** Schedule of administration
- Figure 5:** Q-Q plot for age to test normal distribution.
- Figure 6:** Chronological age distribution
- Figure 7:** Histogram displaying Perceived age sample distribution
- Figure 8:** Frequency of Feared-for characteristics chosen
- Figure 9:** Frequency of Hoped-for self-characteristics chosen
- Figure 10:** Scatterplot of chronological and perceived age illustrating no relationship.
- Figure 11:** Scatterplot of perceived age against discrepancy demonstrating a positive relationship trend
- Figure 12:** Scatterplot of Chronological Age and Age Discrepancy demonstrating a negative relationship trend.



## LIST OF TABLES

<b>Table 1:</b>	Diagnoses
<b>Table 2:</b>	Pain Sites
<b>Table 3:</b>	Medication/Interventions used
<b>Table 4:</b>	Descriptive pain measurement data
<b>Table 5:</b>	Correlation data for pain perception and affective distress
<b>Table 6:</b>	Identity measurement descriptive data
<b>Table 7:</b>	Correlation data between age measures and identity
<b>Table 8:</b>	Correlation data (age and hoped-for and feared-for expectancy and self-efficacy)
<b>Table 9:</b>	Correlation data (centrality and hoped-for and feared-for enmeshment and proximity).
<b>Table 10:</b>	Feared-for and hoped-for enmeshment cross-tabulation
<b>Table 11:</b>	Descriptive data for centrality and feared-for enmeshment.
<b>Table 12:</b>	ANOVA for centrality and feared-for enmeshment category data
<b>Table 13:</b>	Post-hoc analysis – multiple comparisons for centrality and feared-for enmeshment categories
<b>Table 14:</b>	Descriptive data for centrality and hoped-for enmeshment.
<b>Table 15:</b>	ANOVA for centrality and hoped-for enmeshment category data
<b>Table 16:</b>	Post-hoc analysis – multiple comparisons for centrality and hoped-for enmeshment categories
<b>Table 17:</b>	Correlation data for identity measures and pain perception and affective disturbance.
<b>Table 18:</b>	Correlation data for pain perception and affective distress with self-efficacy and expectancy of hoped-for and feared-for selves.
<b>Table 19:</b>	Correlation data for age and pain perception and affective disturbance.
<b>Table 20:</b>	Summary of hierarchical regression for affective distress and perceived age, feared- for self-discrepancy and centrality.
<b>Table 21:</b>	Summary of hierarchical regression for affective distress and perceived age, hoped-for self-discrepancy and centrality.
<b>Table 22:</b>	Correlation data (See Appendix 12)

## ABBREIATIONS

ACT	Acceptance Commitment Therapy
BPI	Brief Pain Inventory
CBT	Cognitive Behavioural Therapy
CES	Centrality of Event Scale
CPAQ	Chronic Pain Acceptance Questionnaire
D	Distribution
DPM	Dual Processing Model
EDT	Experiential Dynamic Therapy
PTSD	Post-Traumatic Stress Disorder
HADS	Hospital Anxiety and Depression Scale
JIA	Juvenile idiopathic arthritis
LOC	Locus of control
M	Mean
NICE	National Institute of Clinical Excellence
NHS	National Health Service
ns	Non significant
OA	Osteoarthritis
PCS	Pain Catastrophising Scale
PCT	Perceptual Control Theory
SD	Standard deviation
SDT	Self Discrepancy Theory
SPSS	Statistical Package for the Social Sciences
VAS	Visual analogue scale

## CHAPTER 1: LITERATURE REVIEW

### 1.2 Introduction

Does being older protect you from developing an enmeshed pain-identity and protect you from poor pain adjustment? This question forms the underlying structure of this thesis, which attempts to further understand the relationship between pain, age and adjustment to chronic pain.

Pain has received vast research attention, as many chronic pain conditions do not suit dominant curative medical models, challenge services and clinicians, and prove economically exhaustive (Woolf & Pfleger, 2003). The psychological impact of chronic pain is undeniable and it is consoling that research has become more focused upon subjective pain experience, evidencing a shift from pain-stimulus response models to more holistic approaches to understand and treat pain.

This thesis will first draw upon areas of the pain-age adjustment literature to consider and understand what may influence differences between age cohorts in terms of pain adjustment. The differences between older and younger individuals in terms of pain related distress, perceived control, coping, catastrophising, and acceptance have been extensively researched, however, developing areas of pain research, such as pain-identity enmeshment, may explain these observed differences. Interestingly, despite the literature indicating greater co-morbidity, distress and physical decline in older people with chronic pain (Keefe, Beaupre, Weiner, & Seigler, 1996; Elliott, Smith, Penny, Emith & Chambers, 1999), this population under reports pain and often does not access or is under-referred for treatment (Riley, Wade, Robinson & Prices, 2000; Weiner, Rudy, Kim & Golla, 2004; Molton, Jensen, Ehde & Smith, 2007). The literature also points to older people experiencing pain as less biologically disruptive, expected and a normative and anticipated outcome of aging (Edwards, 2006), conceptualising pain expression as a sign of weakness with fears of burdening others (Villarruel & de Montellana, 1992). Further research posits that older people are more likely to have achieved life aspirations and attained normal developmental milestones compared to younger people with chronic pain, and therefore pain could be less autobiographically disruptive (Prohaska, Keller, Leventhal & Leventhal, 1987; Edwards, 2006), with old age acting as a buffer against psychological distress (Molton, Jensen, Ehde, Carter, Kraft & Cardenas, 2008) and, perhaps, pain-identity enmeshment.

Age differences relating to pain and identity have been less studied. Research (i.e., Pincus & Morley, 2001; Sutherland & Morley, 2008; Morley, Davis & Barton, 2005) has promoted the impact of chronic pain upon identity, specifically postulating 'pain-identity enmeshment' and by investigating the proximity and disparity to and from an individual's hoped-for and feared-for future selves. This research has illustrated that chronic pain can significantly impact upon our hopes for the future, with proximity to our

fears increasing disability, affective distress and reducing functioning. The concept of pain-identity enmeshment proposes that individuals with chronic pain can develop information processing biases, becoming hyper-vigilant to pain and illness stimuli, in which constructs of the 'self', 'pain', and 'illness', merge and become enmeshed. Currently, we do not know if age moderates this process.

Further research has also identified that chronic pain can be conceptualised as a trauma, which can become central to identity (Perri & Keefe, 2008). The concept of 'centrality' has been proposed (Berntsen & Rubin, 2006) and applied to chronic pain populations (Perri & Keefe, 2008), inferring that trauma (or a significant event such as pain) can become embedded within our identity, becoming a reference point from which to judge other experiences and integrated into our autobiographical memory. This thesis attempts to understand whether pain centrality, similar to enmeshment, is also moderated by age.

A further development within gerontology research has noted differences across the life span in terms of discrepancies between chronological (actual) and perceived (felt) age (Westerhof, 2008) with health variables having the greatest impact upon perceived age (Richardson, Ong & Sim, 2006; Hubble & Russell, 2009). Interestingly, older people endorse negative stereotypes and distance themselves psychologically from their peers (Weiss & Lang, 2012) even in the context of declining health (Sarkisian, Hays & Mangione, 2002), and perceive themselves as consistently younger (Kleinspehn-Ammerlahn, Kotter-Gruhn & Smith, 2008). Their younger counterparts, however, consider themselves prematurely aged in the context of chronic pain (Singer, 1974). Subjective age has yet to be investigated in terms of pain-age-identity enmeshment, and whether feeling younger is protective against pain-identity enmeshment. This thesis also aims to investigate whether this defensive strategy is predictive of pain-identity enmeshment.

Given the international prevalence of chronic pain conditions and their drain upon medical systems from an ever expanding elderly population, understanding the importance of pain-identity enmeshment has important implications for clinical management and psychological intervention. By identifying those who have or those who are at risk of developing pain-identity enmeshment, services could intervene to mitigate the potential of, or reduce co-morbid mental health problems and disability, and minimize their deleterious effect upon an individual's quality of life.

### *1.2.1 When Can Pain Be Considered Abnormal?*

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (IASP, 1994, p.210). Pain can be divided into three categories, neuropathic, nociceptive and

idiopathic. Idiopathic pain describes pain of an unknown cause; nociceptive pain indicates direct tissue damage (with or without central nervous system involvement) and neuropathic pain, results from central nervous system dysfunction or damage relating to the somatosensory system (Lehmann, 2000).

Biological categories are useful, but they reveal nothing about an individual's pain experience. Pain is invisible and a "private experience" (Kotarba, 1983), varying considerably between individuals (Gartrell, 2005; Herr, Mobily & Smith, 1993). Interestingly, pain, in the absence of tissue damage, cannot be differentiated from pain with tissue damage (Keefe *et al.*, 1996). Our responses to another's pain, with or without physical damage, differ (Turk, 1999) and are associated with our perceptions of its validity (Jensen, Turner, Romano & Karoly, 1991; Jensen & Karoly, 1991). Furthermore, pain is not always associated with depression and disability, with distress not directly linked to pain intensity (Jensen *et al.*, 1991). This evidence reaffirms the psychological components of pain and promotes pain as a subjective experience.

We expect pain to be managed and removed, which explains why we seek curative treatments. This indicates that we expect healing to occur and that pain should be transitory. However, sometimes pain has a malevolent side that does not follow the healing trajectories of acute pain and is incongruent with our understanding and expectations of pain relief. Pain can endure and become unresponsive to common methods of relief or medical intervention (Baszanger, 1989). When medical intervention fails to return 'normality', pain can interfere and disrupt our identities, relationships and roles (Sutherland & Morley, 2008).

Definitions of chronic or persistent pain are often used interchangeably (Gartrell, 2005). An underlying question is what pain duration warrants a chronic label. Leventhal, Zimmerman and Gutmann (1984) note acute illness models infer that pain can be labelled, is caused externally, is short-term and can be cured. However, acute labels become incongruous when one or more of these criteria are unmet, with many authors (e.g., Turk & Okifuji, 2001) arguing that chronic pain persists long after the healing process has occurred, and suggest chronic pain can be considered such after 3 to 6 months (Turk, & Okifuji, 2001) or beyond (Payne & Norfleet, 1986). This continued variation in terms of labelling chronic pain is unhelpful and anxiety provoking for individuals who endure with chronic pain in their daily lives.

Some authors (e.g., Cousins, 2002) suggest chronic pain should be considered a disease due to associated psychological and neurological changes as a result of chronic pain. However, common psychological and social aspects of pain often remain ignored (Purves, Penny, Munro *et al.*, 1998). Thankfully, medical interventions have begun to integrate psychological, physical, perceptual and appraisal factors alongside biomedical approaches when conceptualising and treating pain (e.g., Gate Control Theory: Melzack

& Wall, 1965), evidencing a shift away from reductive stimulus response models to more holistic approaches in pain management.

### *1.2.2 The Psychological Impact of Chronic Pain*

The protracted nature of pain and/or associated physical changes can serve as a continual reminder of unremitting and underlying illness, which can be more physically and psychologically distressing than acute transitory pain (Banks & Kerns, 1996). The demanding nature of pain (i.e., attention and cognitive load – Dick, Eccleston & Crombez, 2002), may have a deleterious effect upon the coping strategies and cognitive, behavioural and emotional resources an individual can use.

There are a number of psychological consequences resulting from chronic pain which include interference, interruption and identity enmeshment (Sutherland & Morley, 2008). It makes biological sense that our attention is captured by pain as part of a defensive response to protect ourselves (Eccleston & Crombez, 1999), although this detracts from our ability to engage with activities and other life aspirations and goals. The protracted nature of chronic pain is likely to provide greater interference, impacting more upon a person's sense of self. Therefore, continued exposure to pain, without resolution, impacts significantly upon an individual's perception of their current and future capacities (Sutherland & Morley, 2008).

The psychological impact of pain is undeniable. Research indicates higher depressive psychopathology (Romano & Turner, 1985) compared to the general population (30-54% compared to 5-17% - Banks & Kerns, 1996), amplifying the tendency to consider oneself, the world and others negatively, permeating to our core and increasing our vulnerability to psychological distress (Banks & Kerns, 1996). However, no one single pain-depression model captures all variables that moderate pain disability and dysfunction. For example, several authors (e.g., Faucett, 1994) note that the quality of relationships (i.e., supportive vs. conflicted) impacts upon an individual's pain experience, affective disturbance and pain report, irrespective of pain severity or disorder. Despite this complex relationship, depression can significantly impact upon treatment outcomes with further research identifying common biological pathways and neurotransmitters in pain and depression (Bair, Robinson, Katon & Kroenke, 2003), indicating the necessity of treating or preventing depression to ensure successful treatment outcomes

Anxiety in chronic pain populations has received less research attention. However, the literature notes that, similar to depression, anxiety can also significantly impact treatment outcomes (McWilliams, Cox & Enns, 2003). This is understandable, especially as illness detection and diagnosis drive patient anxiety, perpetuating a need for

personal control, and to seek medical explanation and intervention until exhausted (Aronoff & McAlary, 1992).

In summary, the literature is quite clear in addressing the psychological impact of chronic pain and indicates that affective distress is the greatest indicator of pain adjustment (Keefe, Rumble, Scipio, Giordano & Perri, 2004).

### **1.3 Age Differences in Chronic Pain**

There is a mass of pain research that has identified differences and similarities between age cohorts in terms of the prevalence, perception of and management of pain. This part of the introduction explores noted differences and similarities between age cohorts and what may explain these observations.

#### *1.3.1 Prevalence*

Population surveys suggest that 7.8 million UK people experience chronic pain with a minimum duration of 6 months, and a mean duration of 5.9 years (Breivik, Collett, Ventafridda, Cohen & Gallacher, 2006). This figure is perhaps an underestimate, as many 'suffer in silence' and do not access treatment (Klinger & Spalding, 1998; Verhaak, Kerssens, Dekker, Sorbi & Bensing, 1998). In a review, Verhaak *et al.* (1998) reported a chronic pain prevalence of 2% to 40% (median = 15%, n=15), although suggested that many surveys employ self-report methodologies, which resulted in lower chronic pain prevalence rates (7%) compared to surveys using diagnostic approaches (40%), demonstrating the difference between objective and subjective methods. Verhaak and colleagues (1998) also noted the high prevalence of depression in chronic pain populations, which has common characteristics with pain itself, indicating the unsuitability of measures to capture accurate psychological and physical health information (Romano & Turner, 1985), provoking authors to request further epidemiological research, with more active methods of diagnostic assessment and carefully selected measures to capture accurate affective data.

Despite these limitations, chronic pain is considered more common in older adult populations (Keefe *et al.*, 1996). In one extensive UK study, the prevalence of community chronic pain showed increased pain frequency with age; with arthritic pain the most commonly cited cause in those over 75 years (Elliott *et al.*, 1999). Further epidemiological studies indicate a chronic pain prevalence varying between 7–40% of the population (Battenberg, Parker, & Thorslund, 1997), with 25% to 50% of community dwelling older people suffering from pain conditions, with those residing in residential care even more likely to experience chronic pain (45-80% - McElhaney, 2001). The consequences of chronic pain in the elderly are diffuse and include decreased socialisation, falls, slowed rehabilitation, cognitive dysfunction, malnutrition (Dworkin,

Von Korff, & LeResche, 1990), sleep disturbance (Roy 1986), increased health care use and polypharmacy (Lavsky-Shulman, Wallace, & Kohout, *et al.*, 1985). Furthermore, national clinical guidelines (NICE, 2011) also note the vulnerability of older people with physical health decline to mental health issues (e.g., higher rates of suicide and affective distress) compared to younger adults. This prevalence and vulnerability may be explained by common degenerative conditions observed in the elderly, such as musculoskeletal disorders and advancing vascular diseases, neuralgias and malignancies (Melding, 1991), with older adults more likely to have painful co-morbidities (Mobily, Herr, Clark & Wallace, 1994).

Despite the focus upon older age cohorts, young and middle aged adults are also vulnerable to developing chronic pain conditions, and are considered more vulnerable to the disability and disruption associated with chronic pain. The prevalence of chronic pain in younger cohorts is relatively unknown (Mallen, Peat, Thomas & Croft, 2005). Population-based surveys estimate a lower prevalence in young and middle-aged adults compared to older adults (4-14%). However, other authors indicate that chronic pain is relatively common in younger populations, and that research intimating its rarity is driven by a focus upon specific pain conditions and pain sites (Ramage-Morin & Gilmore, 2010). Nonetheless, The UK Grampian Region Study, found 6.3% of the adult population reported disabling chronic pain (approximately one in every eight persons with chronic pain), with prevalence strongly age (3.4% for 25–34 years compared with 10.6% for  $\geq 75$  years) and female correlated (Elliott *et al.*, 1999).

In summary, chronic pain is considered more prevalent in older adult populations, who are considered vulnerable due to higher rates of age-associated comorbid health conditions. However, chronic pain within younger populations may be underestimated due to inadequate means of data collection and limited research.

### *1.3.2 Pain Perception*

Sarkisian, Hays and Mangione (2002) identified that more than 50% of older adults held lower expectations of successful aging than younger people, held expectations of increased dependency on others, depression, pain related suffering, and reduced sexual ability and energy, with further studies indicating expectations of memory and stamina loss (Hofland, 1992; Liddell & Locker, 1997; Ruzicka, 1998). What appears central is older people anticipate health decline, and attribute chronic pain as a symptom of aging, and as natural and age appropriate (Edwards, 2006), which reduces their emotional response to chronic pain (Prohaska *et al.*, 1987).

Sociological research indicates generational and cultural influences upon pain experience, imposing societal roles which moderate our interpretation and expression of pain (Berkley, 1998). Several authors (e.g., Keefe *et al.*, 1996; Weiner & Ruddy, 2002;



Jones, Fink, Clark, Hutt, Vojir, & Melis, 2005) have noted the pain reports of older people being disproportionate to their actual chronic pain condition, and are considered stoic and resilient as a result. The impact of economic depression and wartime is thought to have inspired older adults to endorse resilience and strength (which are viewed virtuously) and to actively avoid dependency, which they conceptualise as a sign of weakness (Burke, 2006).

Despite pain being expected and considered integral to ageing (Edwards, 2006), expressing pain is considered by older adults as a sign of weakness and vulnerability and associated with the fear of burdening others (Villarruel & Montellano, 1992). This runs congruent with research suggesting older people, compared to younger chronic pain populations, complain less about their pain and manifest less affective distress (Riley *et al.*, 2000; Weiner *et al.*, 2004; Molton *et al.*, 2007), with the aging process potentially acting as a buffer against pain related suffering (Molton *et al.*, 2008). Riley and colleagues (2000) compared pain processing across the lifespan, investigating young (18-44), middle aged (45-64) and older adults (65>), finding age differences in emotional distress and pain behaviour, with older adults reporting fewer emotional responses to pain and less pain related behaviour compared to younger and middle aged adults. Authors (e.g., Harkins & Scott, 1996; Riley *et al.*, 2000) posit that findings indicate the influence of the meaning ascribed to pain, cultural and societal norms, different life circumstances, coping methods, and attitudes and beliefs about pain and aging between age demographics.

Research has investigated the differences between older and younger populations in terms of the importance they ascribe to pain. Older people are less likely to seek medical intervention for milder pain intensities, perceiving these as concomitant of age. Further research notes the defensiveness of older individuals admitting to experiencing pain, disguising or minimising their symptoms (Watkins, Wollan, Melton, & Yawn, 2006). However, when pain severity increases, older people perceive this as evidence of serious illness and seek immediate medical support (Mangione, Marcantonio, Goldman, *et al.*, 1993; Leventhal, Leventhal, Schaefer, & Easterling, 1993). Furthermore, Woodward and Wallston (1987) reported that older patients with chronic pain sought less illness information and were less likely to desire treatment control than younger people, which was associated with lowered self-efficacy regarding pain management.

Research investigating the difference between young adults and older adults with chronic pain is limited, although one study (Sorkin, Rudy, Hanlon, Turk, & Stieg, 1990) looking specifically at differences in chronic pain and age, suggested limited differences in accessing treatment, treatment outcomes and coping strategies (although older people used fewer cognitive strategies – a finding confirmed by Keefe & Williams, 1990). However, a more recent study (Molton *et al.*, 2008) indicated that older people (>60)

employed a wide array of coping strategies compared to younger and middle aged adults, who only increased their choice of coping strategies as their pain severity increased, whereas older people used strategies consistently and continually irrespective of pain intensity.

It would make sense that chronic pain symptoms, in addition to age-related physical and social support decline, should magnify depressive pathology, and yet evidence for this is equivocal. Parmelee, Katz, and Lawton (1991) noted increased depression in older adults with chronic pain compared to younger adults. However, Rustoen, Wahl, Hanestad, Lerdal, Paul, and Miaskowski (2005) noted that despite greater reported pain and co-morbidities than younger adults, older adults reported greater life quality and satisfaction, material comfort and better mood compared to younger adults and these factors were inversely related to depression. Other studies (e.g., Herr, & Mobily, 1993; Sorkin *et al.*, 1990) note no difference between age cohorts with chronic pain and depression. This inconsistency suggests that factors influencing or mediating pain-pathology relationships may differ in age groups (Rudy, Turk & Brena, 1988), but these studies did not explore the relationship individuals develop with their pain (i.e., their identity).

Further research also indicates higher pain thresholds in older adults, but lower pain tolerance compared to younger adults (Gibson, 2003). This may explain the tendency for under-reporting milder pain by older adults. However, research also implies that the physiological mechanisms involved in pain detection degrade over time (Farrell, Gibson & Helme, 1996). Debate continues, with some authors suggesting no difference between young and older populations and others reporting older people as less responsive to pain (e.g., Corran, Farrell, Helme, & Gibson, 1997). Currently, no studies have investigated the belief that pain is normal for life contexts (i.e., age/life stage), which is a promising area for further research (Molton *et al.*, 2008). However, earlier research demonstrates that younger people evidence a low and non-significant correlation between pain severity and depression ( $r = 0.01$ ) whereas a strong direct association was observed in older patients between pain severity and depression ( $r = 0.51$ ) suggesting that the relationship between pain and depression varies substantially depending upon age (Turk, Okifuji & Scharff, 1995). But again, such results have been challenged by studies examining community samples of older adults finding that people with chronic pain over the age of 65 report lower levels of depression compared to younger cohorts (e.g., Comstock & Helsing 1976; Eaton & Kessler, 1981).

In summary, it seems pain reports in older people are affected by generational and cultural influences, where older adults endorse stoicism, perceive pain expression and dependency upon others as a weakness and consider chronic pain a symptom of aging

itself, possibly explaining why they under-report pain and experience disproportionate affective disturbance.

### *1.3.3 Perceived Control*

Health locus of control (LOC) is considered a key element in chronic pain adjustment (Sullivan, Stanish, Waite, Sullivan & Tripp, 1998) and is an enduring research construct (Gibson & Helme, 2000). Health LOC refers to a person's sense of control over their illness/pain, and has been described as two attribution styles, internal and external LOC (Rotter, 1966). An internal LOC refers to the expectation that 'reinforcing events' are dependent on an individual's behaviour and sense of personal agency, whereas an external LOC refers to the expectation that 'reinforcing events' are outside of an individual's control. Levenson (1981) added to this definition suggesting dividing the LOC construct into 3 parts; internal LOC, chance LOC and LOC by powerful others (e.g., family, and medical professionals).

The literature (e.g., Buckelew, Shutty, Hewett, Landon, Morrow, & Frank, 1990) infers that having a greater internal LOC, the greater active coping and better adjustment. Further research also indicates that individuals with a greater internal LOC report less intense and less frequent pain (Toomey, Mann, Abashian, & Thompson-Pope, 1991), lesser mood disturbance (Jordan, Lumley & Leisen, 1998) and greater compliance to medical regimens (Harkapaa, Jaervikoski, Mellin, Hurri & Luoma, 1991) compared to those who have an external LOC and employ more passive coping strategies and report greater pain related disability (Harkapaa, Jarvikoski & Estlander, 1996).

There is limited research with regards to perceived control in elderly persons, although the literature contends that older people with chronic pain demonstrate a higher propensity for an external LOC (Melding, 1995) and rely on chance LOC and powerful others (Buckelew *et al.*, 1990). This implies that older persons should complain more about pain, report greater pain intensity and exhibit greater pain related affective disturbance but the literature does not fully support this (Harkins 1988; Melding 1991; Toomey *et al.*, 1991). However, an external LOC could be adaptive, given that an internal LOC has been found to be associated with self-blame and escape-avoidance behaviours, which are more frequently observed in younger populations compared to older populations (Blanchard-Fields & Robinson, 1987).

Turk and colleagues (1995) contend that cognitive factors (e.g., perceived control and perceived pain interference) are unimportant in older populations with chronic pain, contributing little to the pain-depression relationship, which mediates the entire relationship in younger chronic pain populations (Rudy, Kerns & Turk, 1988). Gibson and Helme (2000) have challenged this, demonstrating the greatest predictors of depression in older aged chronic pain patients are the level of perceived interference and

an internal LOC, which were amenable to change following psychological (e.g., cognitive behavioural) intervention. However, research also contends that individuals with an internal LOC report less intense and frequent pain (Toomey *et al.*, 1991), less affective disturbance (Jordan, Lumley & Leisen, 1998) and greater medical compliance (Harkapaa *et al.*, 1991).

In summary, the literature once again contends differences between old and young cohorts with chronic pain, to the extent that it is posited that cognitive factors are redundant for older individuals. Evidence also suggests that older adults evidence externalised LOC which although should, according to the literature, be associated with more intense pain, greater pain frequency, greater mood disturbance, older people do not evidence these behaviours, where an external LOC for older people may be protective from self-blame and fear-avoidance behaviours.

#### *1.3.4 Catastrophising*

There is no agreed upon definition of catastrophising (Sullivan, Lynch & Clark, 2005), however, it appears that catastrophising is a cognitive process of rumination and excessive worry, which is exaggerated and negatively orientated towards painful stimuli and experiences (Sullivan, Bishop & Pivik, 1995). For example, specific assessments measure catastrophising (e.g., *The Pain Catastrophising Scale*: Sullivan, Bishop & Pivik, 1995) by measuring magnification, rumination and helplessness.

Catastrophising is commonly observed in chronic pain populations (Richardson, Ness, Doleys, Banos, Clanfrini, & Richards, 2010) and is associated with negative affect (Ellis & D'eon, 2002). Noted behaviours include a focus upon pain, concerns about potential harm (e.g., physical, emotional and social), perceptions of being unable to cope and descriptions of negative affect (Sullivan, Bishop & Pivik, 1995). Nonetheless, catastrophising can also be considered a method of communication to facilitate assistance and attuned care from others, which can have a positive impact upon pain management, pain intensity, and has positive emotional and psychological benefits (Sullivan, Tripp & Santor, 2000). Catastrophising is also conceptualised as a stable 'trait-like' characteristic (Sullivan, Bishop & Pivik, 1995) and a situational response to pain or anticipated pain (Larsen, Taylor & Asmundson, 1997). Catastrophising is well considered within the literature, which confirms its commonality in chronic pain populations (Richardson *et al.*, 2010), and although an appraisal strategy, it is generally agreed to be maladaptive (Keefe, Brown, Wallston & Caldwell, 1989; Lin, 1998) and more commonly observed in women (Sullivan Tripp & Santor, 2000).

Research suggests that catastrophising can increase pain experience, distress and disability, reduces quality of life, increases pharmacological and health service use (Sullivan, Thorn, Haythornthwaite, Keefe, Martin, Bradley, & Lefebvre, 2001; Lame,

Peters, Vlaeyen, Kleef & Patijin, 2005) and is a strong predictor of both disability and depression (Cook, Brawer & Vowles, 2006; Vowles, McCracken & Eccleston, 2008). Catastrophising increases the attentional bias towards pain, impacting upon an individual's ability to engage in everyday activities, life goals and aspirations (Crombez, Eccleston, Baeyens & Eelen, 1998). Further research notes the association between catastrophising and the perception of pain as uncontrollable and indicative of underlying harmful conditions (Jensen & Karoly, 1991). This is supported extensively within the pain research literature.

Age differences in catastrophising and chronic pain are limited. However, authors (e.g., Edwards, 2006) contend that although catastrophising is associated with greater pain distress (Severeijns, Vlaeyen, den Hout & Webber, 2001) this is not observed as strongly in older populations compared to younger populations with chronic pain (Riley *et al.*, 2000), appearing to indicate that older adults catastrophise less. Nonetheless, due to the paucity of research in this area, this is speculative.

Although not an exhaustive review of the pain-catastrophising literature, it is clear that pain is incredibly distressing, and can lead to cognitive and psychological processes which interact with an individual's level of distress, disability, age, personality and how they relate to others. Therefore, it becomes imperative to understand these relationships further, and ameliorate psychological problems or processes which impact upon distress, irrespective of actual injury or age. Once again, however, the literature appears to suggest that older adults with chronic pain seem to differ from their younger counterparts in terms of catastrophising.

### *1.3.5 Acceptance*

Authors (e.g., Lethem, Slade, Troup & Bentley, 1983) argue that given pain involves both sensory and psychological components, the psychological consequence of pain is best conceptualised as 'fear', a fear of pain and future pain, which can lead to fear-avoidance behaviours, which increase distress, anxiety sensitivity and disability over time (Vlaeyen, Kole-Snijders, Boreren & Van Eek, 1995; Asmundson, Norton & Veloso, 1999). The literature notes the common 'protective' rationale for individuals to avoid the sensory component of pain, and through fear of pain, disengage from their lives and avoid previous meaningful activities. This fear-avoidance model is well established within the pain literature (Linton, Vlaeyen, & Ostelo, 2002), and although protective in the interim, only reinforces further avoidance and disengagement from activities which are often associated with identity and self-esteem.

Pain acceptance is conceptualised as a response to pain without attempts to control or avoid it (McCracken & Eccleston, 2003). Individuals who are more willing to experience pain, and the cognitive and affective components of pain, remain more

involved and engaged with valued activities of daily living, use fewer health care services and medication, remain in employment and demonstrate better emotional, physical and social functioning, compared to individuals who employ greater fear-avoidance behaviours and evidence greater disability and distress (McCracken, 1998, McCracken, Vowles & Eccleston, 2004, McCracken, Carson, Eccleston & Keefe, 2005, Viane, Crobez, Eccleston, Popper, Devulder, Van Houdenhove & De Corte, 2003; McCracken & Samuel, 2007). It is, therefore, understandable for pain treatments to aim for the re-acquisition of previous activities in individuals with chronic pain, and to attempt to reduce fear-avoidance behaviours, and promote adjustment and acceptance. However, inferences drawn between pain acceptance and activity engagement should be viewed cautiously, as a variety of variables influence the relationship between an individual's ability to accept their pain despite the improvements noted. The value of behavioural activation is not a new finding, demonstrating equal effectiveness as cognitive therapy for depression (e.g., Cuijpers, Van Straten & Warmerdam, 2007).

Further research (e.g., Nicholas & Asghari, 2006) has investigated the influence of other variables associated with acceptance (e.g., disability level, pain intensity, affect, and pain self-efficacy). Although outcomes have indicated activity engagement as a significant predictor of mood, pain beliefs, and self-efficacy were a greater predictor of disability. They conclude that activity engagement is a more robust predictor of emotional rather than functional adjustment. These findings are consistent with further definitions of acceptance which is considered the pursuit of "personally relevant goals" rather than pain control (McCracken & Eccleston, 2003, p.159).

Surprisingly, there is limited research on the cohort differences and pain acceptance, despite narratives of elderly stoicism and pain expectation and acceptance. Earlier studies have suggested comparable rates of activity levels in younger and older cohorts, with reports that similarities are more important than differences per se (Sorkin, *et al.*, 1990), with other studies finding no significant correlation between age and acceptance (e.g., McCracken, 1998).

## **1.4 Pain & Identity**

### *1.4.1 Introduction*

Chronic pain is considered to cause a "crumbling away of former self-images without simultaneous development of equally valued new ones" (Charmaz, 1983, p.184). However, this process can promote individuals to reappraise their identities and develop a new sense of self, the self with pain (Smith & Osborn, 2007). The overriding theme of the pain-identity research suggests that emotional adjustment to chronic pain is partly dependent upon the extent to which aspects of the self become enmeshed with pain (Pincus & Morley, 2001). Furthermore, the literature also infers differences between

older and younger cohorts in terms of pain perception, management, coping, and accessing treatment, although there is a limited understanding about what drives these differences. Newer and developing research may illuminate why older people, unlike their younger counterparts, are protected from the negative consequences of chronic pain such as how biographically disruptive chronic pain is, the impact of perceived over chronological age, and the process by which chronic pain threatens identity.

#### *1.4.2 Biographical Disruption*

Normal health is referred to as ‘biographical continuity’, however several authors (e.g., Williams, 2000) note the biographical disruptiveness of chronic pain, which drastically disrupts an individual’s life and identity, where patient behaviours become focussed upon trying to reduce the uncertainty of chronic illness (Weiner, 1975; Comaroff & Maguire, 1981; Bury, 1982; Kotarba, 1983; Williams, 1984). Charmaz (1994) posits that chronic pain drives people to be cognizant of death, creating existential anxiety, which is particularly disruptive when individuals consider themselves too young to die or define and expect themselves to be healthy. However, how do individuals cope with this; cope with the disruption that is caused by chronic pain? Bury (1991) defines coping as a cognitive process where individuals with chronic pain learn to tolerate their illness which ‘involves maintaining a sense of value and meaning in life, in spite of symptoms and their effects’ (Bury, 1991, p461).

Giddens (1979) conceptualised chronic illness as a ‘critical situation’, and suggested that “we can learn a good deal about day-to-day situations in routine settings from analysing circumstances in which settings are radically disturbed” (p.123). Bury (1982) contends that chronic illness disturbs the structures of everyday life, provoking individuals to consider pain and suffering which, for younger people, may seem a distant possibility or the plight of older people. What seems important is the insidious nature of chronic pain, where initial symptoms are initially regarded as nuisances rather than indicators of future pain and suffering, and when pain becomes protracted, normative explanations and attributions (i.e., over-exertion) become insufficient. Therefore, a disparity develops between our expectations of our lives and our bodies and what we can no longer explain by lay rationale.

A disruptive event, such as the development of chronic pain, can provoke individuals to reconsider their lives and future plans, which are often left in disarray. Bury (1982) purports that normal taken for granted assumptions and behaviours about health are breached, and a greater focus is directed upon physical capacity and striving to seek help and understand what is unfolding. Furthermore, a more profound impact occurs on one’s explanatory systems, impacting upon a person’s biography and sense of self, as

well as an individual's usual responses of mobilising resources in the event of a perceived threat (e.g., diagnosis).

Conversely, it seems that individuals who develop chronic conditions earlier experience this as less disruptive. For example, individuals diagnosed with chronic pain in their childhood or congenitally, adapt well, report less psychological distress, co-morbid psychological problems, and engage in social activities with normative levels of energy and functioning (Peterson, Mason, Nelson, O'Fallon, & Gabriel, 1997; Wirrell, Lang & Canfield, 1995). Further studies (e.g., Laaksonen & Laine, 1961; Scott, Ansell & Huskisson, 1977) indicate that individuals, who have developed Juvenile Idiopathic Arthritis (JIA) also experience less pain compared to individuals who develop conditions in adulthood. This suggests that during our formative developmental years, individuals are able to adapt to chronic pain conditions compared to those who develop chronic pain conditions in later parts of the developmental trajectory. However, other authors (e.g., Timko, Stovel, Moos, & Miller 1992) contend that psychosocial adjustments continue with time as an individual adapts to their disease and posit the importance of context in the adjustment to chronic illness.

Anticipated and expected ontogenesis with regards to the development of illness has been shown to influence the appraisal of chronic ill health as traumatic and disruptive (Grinyer, 2007; Wilson, 2007). Williams (2000) and Faircloth, Boylstein, Rittman, Young, and Gubrium (2004) suggest that those with multiple chronic co-morbid conditions may find the onset of a further chronic condition as less biographically disruptive, and a further event in one's on-going ontogenesis, which has been referred to as 'biographical flow', and anticipated and normative (Faircloth *et al.*, 2004; Hopkins, 2004; Richardson, Ong & Sim, 2006).

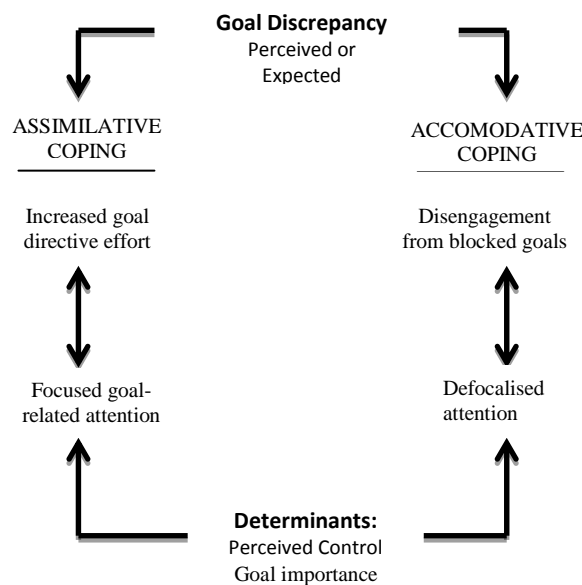
#### *1.4.3 Developmental Losses and Gains over the lifespan*

Sociological tradition views normative conceptions regarding the life course as phenomena constructed by society (e.g., Riley, 1986), implying that society provides directional timetables of ontogenesis. However, older adults do not report reductions in life quality despite the physical limitations of ageing (Riley *et al.*, 2000; Weiner, *et al.*, 2004; Molton *et al.*, 2007; Molton *et al.*, 2008). Perhaps, overall, younger people have more to lose, have fewer resolved developmental plans and aspirations, and have more defined and potentially valuable familial roles. Younger people are more likely 'transitioning' in terms of family growth and family roles, embarking on full-time education and developing their careers. Experiencing chronic pain at these points within their developmental trajectory can be particularly disruptive (Boersma & Linton, 2006). Although both older and younger populations are vulnerable to the consequences of chronic pain, the context of 'life stage' for each cohort may drive different vulnerabilities



and challenges in the context of chronic pain, whether deteriorating co-morbid health, or through the disruption of important and expected developmental milestones.

The Dual Processing Model (Brandtstadter & Renner, 1990: Figure 1) has been applied to chronic pain (Van Damme, Crombez & Eccleston, 2008) and considers how people balance developmental gains and losses across the lifespan. Chronic pain is considered a threat to personal goal attainment (Schmitz, Saile & Nigles, 1996). Research suggests that attaining developmental goals is challenged by two distinct problem solving models: assimilation (adapting in pursuit of the same goals) and accommodation (flexibly adapting and modifying goals in the context of reduced resources). Both strategies are useful, although accommodation has greater relationships with lowered affective distress, better problem solving and weakens the associations between pain intensity, disability and depression (Schmitz, Saile & Nigles, 1996). Schmitz and colleagues (1996) also found that those who view their pain as needing control continue to employ more maladaptive assimilative coping strategies, and that persevering with ‘blocked goals’ is futile, and detrimental to self-efficacy and self-esteem.



**Figure 1:** The Dual-Process Model (Brandtstadter & Renner, 1990).

Importantly, the difference between older and younger individuals may be how many of their developmental trajectory and life goals have been achieved prior to developing chronic pain. It would make sense that older adults developing chronic pain in their later years are likely to have reached normative developmental milestones and personal goals compared to young or middle aged adults who have more of their life to lead and ‘milestones’ to reach. Schmitz and colleagues (1996) also noted that as affective distress in chronic pain increases, the flexibility of strategies to achieve personal goals reduces. However, in the context of chronic pain and old age, where depression has been identified to be less prevalent in older adults, this may drive older adults to be more

accommodative than younger adults who evidence both greater depression and more pronounced assimilative strategies. Authors have noted accommodative strategies increase with advancing age (Bradstadter & Renner, 1990) and are more focused upon prevention and compensation (Higgins, Shah & Friedman, 1997).

Research suggests that older people expect physical health decline and experience this as less biographically disruptive and continue to view and rate their health as 'good' (Bury & Holme, 1990, Sidell, 1995). Sanders, Donovan and Dieppe (2002) noted that older adults with osteoarthritis (OA), although acknowledging the impact of chronic pain symptoms as disruptive to daily living, considered this normal and an integral part of their biography. In contrast, research also indicates the shock associated with chronic pain development in younger populations, which contrasts distinctly with common cultural paradigms of chronic pain pathologies, and is experienced as a sign of 'premature aging' (Singer, 1974). An individual's expectation of a normal, predictable and chronological sequence of aging is marred by the occurrence of an 'insult' which offsets expected and often culturally paradigmatic trajectories, leading to a life that is unpredictable, unexpected and painful.

In summary, it seems that chronic pain in older age is less 'insulting' compared to its development in younger adult populations, offsetting normative and expected patterns of ontogenesis. Accommodative strategies employed by older adults to adapt goals and aspirations in relation to their pain may explain why they adapt more to chronic pain compared to younger adults, whose personal goals and aspirations are blocked by chronic pain and demonstrate greater affective disturbance and continue to employ maladaptive assimilative strategies. However, it seems that older cohorts endorse and utilise aspects of their age to understand and process their declining health and yet protect themselves from identifying too much with negative old-age related stereotypes which protects their self-esteem and identity. This may be explained by newer research investigating negative discrepancies between chronological age and subjective age, which may be protective for older people who utilise downward social comparisons to maintain a positive and normative sense of self in the context of chronic pain.

### **1.5 Perceived or Felt Age**

Age perception in the context of chronic pain is an interesting and developing research area, providing further possible explanation for some of the psychological benefits in avoiding identifying with an age group that has negative health related stereotypes.

Perceived age, an individual's 'felt age', may be incongruent with chronological age. Perceived, or felt age, is understood to be driven by which age group an individual feels they have an affinity with or shared characteristics (Cutler, 1982, cited in Steitz &

McClary, 1988). Research contends that adults tend to feel younger than their chronological age with this increasing as we age (Barak & Stern, 1986; Goldsmith & Heiens, 1992; Westerhof, 2008). However, the literature also notes that perceived age is more studied than 'ideal age', which is defined as what age an individual would like to be (Keyes & Westerhof, 2012). Like perceived age, ideal age also increases as we age (Barak, 2009). Interesting, although there are a variety of variables that contribute to perceived 'felt' age, health variables contribute the most, with poorer health associated with feeling disproportionately older than one actually is (Richardson, Ong & Sim, 2006; Hubble & Russell, 2009). Perceived age in chronic health is generating interest regarding the reasons for dissociating from one's peers, its association with psychological wellbeing and in which contexts this is useful or maladaptive.

### *1.5.1 Feeling younger as self-enhancing*

Feeling younger is considered self-enhancing and is viewed as a reaction towards a society that stigmatizes old age. Old-age is devalued by technologically developed societies, with older adults confronted by many age-related stereotypes including senility, unattractiveness, incompetence (Levy & Banaji, 2002; Weiss & Lang, 2012), perceptions of loss, declining power, productivity, social roles and status (McTavish, 1971). Authors (e.g., Linn & Hunter, 1979) contend that negative perceptions are due to the associations between old age and poor health, low self-esteem, and mortality. These negative associations provoke existential anxiety which needs to be avoided or managed by an individual. Being perceived as old can be threatening to self-esteem and has negative psychological effects (Zebrowitz & Montepare, 2000). Maintaining a perception of youthfulness is associated with indicators of successful aging and conceptualised as the antithesis of negative old age archetypes with high energy, vitality and being engaged with life and high productivity (Kotter-Gruhn, Kleinspehn-Ammerlahn, Gerstorf & Smith, 2009). Therefore, it makes sense that feeling younger would be associated with positive mental health, wellbeing and functioning (Montepare, 1996; Sneed & Whitbourne, 2003; Westerhof & Barrett, 2005).

Feeling younger is considered an identity process and has been explored using developmental theory, which suggests that feeling younger is an adaptive, compensatory and assimilative strategy used to face the process of aging and existential anxiety (Sneed & Whitbourne, 2003). However, it seems that there is a difference between wanting to be younger and feeling younger, with the former considered a maladaptive assimilative strategy and having negative implications with health (Keyes & Westerhof, 2012). Research indicates that the more adults feel younger the more physical, psychological and social functioning increases, with the rate of mortality decreasing (Barak & Stern, 1986; Uotinen, Rantanen & Suutama, 2005; Demakakos, Gjonca & Nasroo, 2007; Infurna,

Gerstorff, Robertson, Berg & Zarit, 2010). Further research posits whether wanting to be younger is actually self-enhancing, as when the disparity between ideal and actual age increases (i.e., wanting to be an age that is more distant from our true age) psychopathology also increases (Uotinen, Suutama & Ruoppila, 2003). Therefore, there is a difference between identifying with a different age group and wanting to be a different age.

Research indicates that older adults dissociate from their peers to avoid age related stereotypes which threaten their psychological wellbeing and self-esteem (Weiss & Lang, 2012). Belonging to an age group, especially one that has a positive social identity (Abrams & Hogg, 1988) is associated with higher levels of self-esteem and greater psychological wellbeing (Westerhof & Barrett, 2005). The literature notes that, generally, older people distance themselves from their own age group, by hiding or disguising their age and endorsing negative stereotypes about their peer group (Weiss & Lang, 2012). Therefore, it makes sense that in the face of chronic health and upon realising the finite nature of life (Lang, 2000), age dissociation is an adaptive defensive strategy (Weiss & Lang, 2012). Older adults have been found to consistently, on average, feel 10-20 years younger than they actually are (Cleaver & Muller, 2002; Kleinspehn-Ammerlahn *et al.*, 2008), whereas younger individuals label themselves as 'prematurely aged' in the face of chronic pain (Singer, 1974).

Early research has indicated differences between the ages in terms of perceived age. Montepare and Lachman (1989) investigated perceived age differences and their relationship with aging fears and life satisfaction across the lifespan. Results suggested that adolescents hold older subjective age identities, young adults maintain same age identities, mid and older aged adults report younger age identities. Findings also revealed that discrepancies between subjective and actual age were associated with personal fears of aging and life satisfaction, especially in younger men and women.

More recent research (Stephan, Chalabaev, Kotter-Grühn & Jaconelli, 2013) has specifically targeted older adults in directing their attention towards downward (lower age) social comparisons, finding positive benefits between feeling younger and feeling physically better, with older individuals rejecting old age stereotypes and adopting counter stereotyped youthful behaviours. Stephan and colleagues (2013) also observed a consistent finding from previous research (Barrett, 2003; Frieswijk, Buunk, Steverink, & Slaets, 2004; Cheng, Fung & Chan, 2007; Infurna *et al.*, 2010) that perceiving oneself as stronger, healthier and more able than one's peers also has an enhancing impact upon perceived age. Interestingly, perceived age appears to rival or outperform chronological age as a predictor of psychological and health-related outcomes (Westerhof & Barrett, 2005; Kotter-Grühn *et al.*, 2009; Stephan, Caudroit, & Chalabaev, 2011). Therefore, it seems essential to support individuals in achieving and maintaining a sense of

youthfulness especially when associated with better health and life quality (Kotter-Grühn *et al.*, 2009).

Contrasting literature suggests that youth and old age have both positive and negative stereotypes, and individuals do not always readily accept negative attributes over positive ones (Brubaker & Powers, 1976). For example, perceiving oneself older than a chronological age of 75 is likely to be very different for a 30 or 40 year old adult as, in this context, older age may be associated with perceptions of maturity, attainment and wisdom. However, the benefits or positive associations with old age may be contravened in the context of chronic pain and physical health decline, and where negative age related stereotypes become more pronounced.

In summary, poorer health seems associated with an older subjective age (Markides & Bolt, 1983; George, Multran & Pennybacker, 1980). However, for older adults who despite anticipate health decline and unsuccessful aging (Sarkisian, Hays & Mangione, 2002) still feel younger. Therefore, it may be useful to consider perceived age in relation to chronic pain adjustment. Once again, the literature demonstrates individuals with chronic pain experience a disparity between what they are and what they feel to be - in this case their age. Such disparity or proximity between actual and subjective age appears to have a role in maintaining one's sense of self, or can threaten it.

### *1.5.2 Self-Discrepancy Theory*

Additional research has focused upon the human drive to maintain our personal identities in the face of chronic pain (Sutherland & Morley, 2008, Kindermans Goossens, Roelofs, Huijnen, Verbunt, Morley & Vlaeyen, 2010). Goal, task and identity interference varies across individuals, but these are disrupted more in the context of chronic pain (Kindermans *et al.*, 2010). Other authors (e.g., Morley & Eccleston, 2004) note pain's association with losses of desired social roles or attributes, which are detrimental to identity and self-esteem. Despite these associations, pain interventions and research have yet to thoroughly target these areas and instead focus upon coping (e.g., cognitive behavioural therapy).

Several self-identity models have been proposed within the pain-identity research including Self-Discrepancy Theory (Higgins, 1987). The model suggests that identity can significantly affect mood. Higgins (1987) proposed that when a discrepancy between our actual-self (the reality of who and what we are), our ought-self (what and/or how we believe we should ought to be) and our ideal-self (our hopes and wishes for ourselves) occurs, identity is disrupted which results in negative emotional responses (e.g., depression and anxiety). Specifically, disparity between actual and ideal self conceptualisations can result in dissatisfaction, disappointment and melancholy, whereas disparity between actual and ought-self conceptualisations can result in anxiety related

emotions due to the perceived threat and fear of negative outcomes and consequences. Higgins (1987) proposes that greater proximity between ideal and ought-self conceptualisations results in less distress and a more established self-identity, and that when discrepancies occur; individuals become motivated to achieve greater proximity to reduce distress and associated negative psychological consequences of such disparity.

The Self Discrepancy Model (Higgins, 1987), however, does not account for what an individual wishes to avoid becoming, which is particularly relevant in chronic pain (e.g., older people who fear burdening and becoming dependent on others). Research has identified depression as uniquely associated with thoughts of loss and failure (a failure to attain rewards) and anxiety as uniquely associated with thoughts of harm and danger (Clark, Beck & Brown, 1989). This is pertinent in chronic pain, given the threat of health decline, and it may be possible that anxiety, although under studied may be more associated with the perceived threat and harm associated with health difficulties.

Carver, Lawrence and Scheier (1999) posited that ideal and ought-self discrepancies did not account for underlying 'fears', and drew on the concept of the feared-for self derived from Markus and Nurius' (1986) work on 'Possible Selves'. Whereas Self-Discrepancy Theory places emphasis on ought-selves and associated anxiety and agitation when deviation occurs, Markus and Nurius (1986) placed greater emphasis on the feared-self. The feared-self is defined as a set of qualities or characteristics that an individual does not want to become and is concerned about possibly becoming (Oyserman & Markus, 1990), with the idea that an individual actively deviates from such representations to ensure that feared-self characteristics do not occur.

Carver and colleagues' 'Control Theory Analysis' (1999) suggests that the rate at which discrepancies are resolved determines an individual's emotional state. Carver and colleagues (1999) investigated 'approach' and 'avoidance' motives in relation to a disparity from ought-self characteristics finding associated agitation, however this association was less robust than that with the feared-self, which pre-empted the predictive role of ought-self for agitation related effects. Carver and colleagues (1999) also noted that the ought-self did not predict anxiety or guilt when individuals were closer in proximity to their feared-self, although when individuals had a greater disparity from what they feared, the predictive quality of the ought-self re-emerged. In conclusion, it seems that motivation to distance oneself from what is feared becomes more paramount than what we feel we ought to be, which is dominated by avoidance motives. However, when a disparity between what we are and what we fear occurs, we engage in approach motivates to achieve what we feel we ought to be. Nonetheless, in the face of chronic pain, our feared-selves are likely to be more pronounced (Kindermans *et al.*, 2010).

Kindermans *et al.* (2010) recently examined the content of self-descriptions in chronic pain patients over eight domains (interpersonal, intrapersonal, wellbeing,

personal, achievement-related, physical appearance, self-expression, and religion). Kindermans and colleagues found associations between greater discrepancies and depression and disability status/severity, which appeared more related to feared-selves than ought-selves. Kindermans *et al.* (2010) also noted psychological, physical and emotional attributes were located in ideal representations, with social, interpersonal and wellbeing (with high disability) viewed as part of the 'ought-selves' construct. Surprisingly, depression was found to be unrelated to self-guide content and interestingly, most attributes within all self-representations were interpersonal in nature, illustrating the importance of social roles and relationships. Furthermore, the second largest categories were physical, psychological and emotional wellbeing. Therefore, though pain and wellbeing are important, an individual's role and identity in relation to others is paramount.

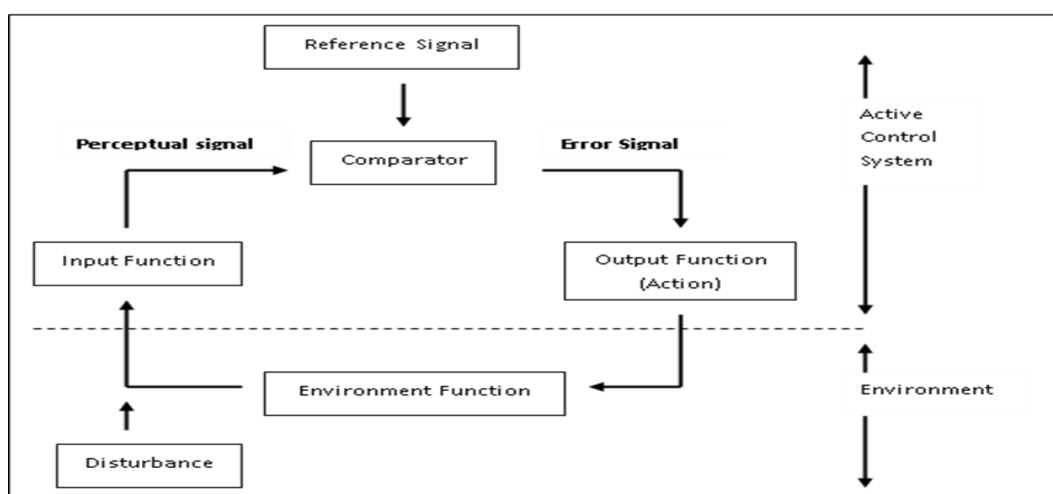
### *1.5.3 Possible Selves*

The 'Possible Selves', as proposed by Markus and Nurius (1986), suggests more explicitly than Higgins' (1987) SDT the motivational aspect of aspiring to be what an individual wants to become (i.e., the hoped-for self), and to avoid representations that are feared (i.e., the feared-for self). Individuals are motivated to bring their hoped-for and actual-selves closer together (proximity), or to develop more realistic benchmarks in which to appraise themselves (accommodation).

Age comparative studies have indicated differences between young, middle aged and elderly adults (Ryff, 1991) in terms of self-assessments of present, past, and future selves. Young and middle age adults perceive considerable self-improvement over time on all dimensions of well-being, and elderly groups perceive stability but foresee a decline in wellbeing. This suggests that with aging, individuals expect a closer proximity to their ideal selves but anticipate decline (Heckhausen, Dixon & Bates, 1989). Interestingly, the literature also notes that older adults evaluate their health positively, despite physical decline and disability (Rowe & Kahn, 1998), which, perhaps, enables older adults to maintain their identity and self-esteem (Staudinger, Freund, Linden, & Mass, 1999). Further studies indicate that older people have fewer possible selves than their younger counterparts (Markus & Herzog, 1992), with older adults more likely to report possible selves within physical functioning, leisure and lifestyle domains and feared-for selves in terms of institutionalisation and dependence. This may explain the lesser autobiographical disruptiveness of chronic pain in old age (Edwards, 2006). In contrast, middle aged adults with chronic pain report possible selves within occupation, wealth and family domains (Hooker & Kaus, 1992), which may explain why younger adults experience pain as more biographically disruptive and a sign of premature aging (Singer, 1974).

Self-narratives (Gergen & Gergen, 1988) describe an individual's attempt to understand his/her cross-time trajectory, which can be stable (i.e., self-images remain stable over time), progressive (i.e., self-images increase over time) or regressive (i.e., self-images show decrements over time). Suls and Mullen (1982, p.100) argue that comparison processes (social and temporal) are important ways individuals judge the adequacy of their abilities throughout life, postulating that an "individuals position in the life cycle determines which mode of evaluation (temporal, social-similar and social-dissimilar others) they use". They further hypothesise that with age, individuals rely less upon social comparisons and more upon temporal evaluations due to receding social contacts and cognitive and physical changes. Additionally, Birren and Renner (1980) propose that experience during life can modify aspirations and are subject to change. Thus, as we enter the later stages of our lives our ideal and actual selves may more closely approximate than previously. This has important implications for identity and pain. If ideal and hoped-for selves are closer in proximity, identity may be less vulnerable or threatened as we age, which prevents the integration of chronic pain into identity, meaning that old age acts as a buffer against pain-identity enmeshment. As yet, research has yet to answer these questions directly for older adults.

Hooker and Kaus (1994) suggest a cognitive-emotional association between possible selves and an individual's life values, which guides and motivates an individual's behaviour. These behaviours aim to increase the possibility of attaining one's hoped-for self, produce positive emotions and reinforce an individual's engagement with said behaviours. In contrast, behaviours which increase the proximity to one's feared-for self are likely to decrease given that they produce negative emotions and are thus avoided. This runs congruent with other identity models such as the Perceptual Control Theory (Powers, 1973; Figure 2)



**Figure 2:** The Perceptual Control Model: redrawn from Powers, 1973



This model suggests that disparities (i.e., known as a reference signal/error signal) between one's ideal and ought/feared-self (i.e., known as personal wants and goals - a 'comparator') forms reference points for individuals who become driven to achieve greater proximity or disparity by the exertion of an action which changes their environment and, therefore, changes their experience. This is referred to as a 'discrepancy reducing loop' (Powers, 1995). Utilising the work of Markus and Nurius (1986), Carver and Scheier (2002) refer to goals we wish to avoid as 'anti-goals'. Integrated within the PCT model, anti-goals serve to enlarge the discrepancy loop, further driving behaviour to move away from anti-goals. However, if no alternative course of action is achieved this results in emotional distress (Mansell, 2005). Carver and Scheier (2002) argue that 'discrepancy enhancing loops' are stabilised by 'discrepancy reducing loops', with avoidance of feared goals (anti-goals) achieved by moving towards goals that are consistent with one's values, with the loop continuing until the discrepancy is solved, and argue that the rate at which discrepancies are resolved determines an individual's emotional state.

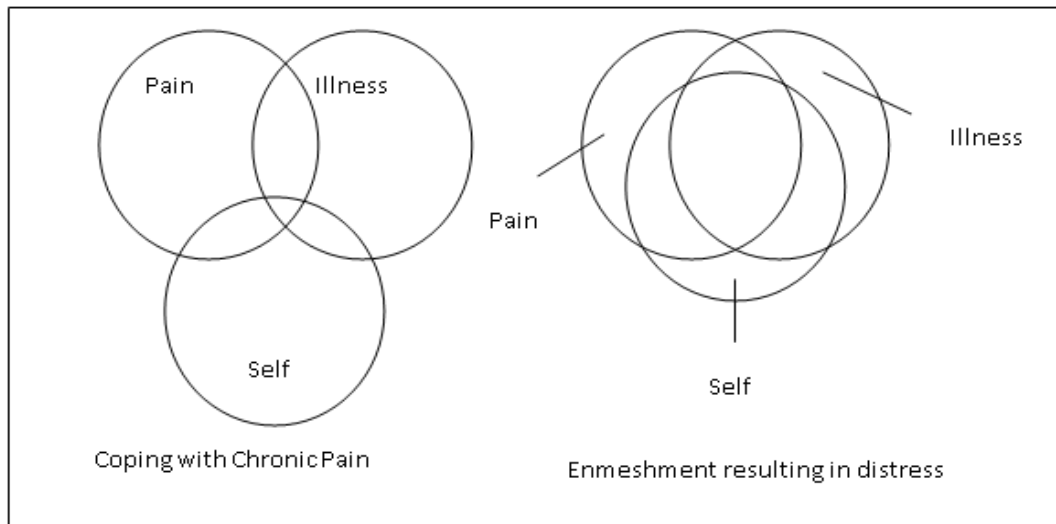
Kindermans *et al.* (2010), in a study of 83 patients with chronic non-specific lower back pain, observed that emotional distress was associated with feared-self proximity. This was also associated with increased safety behaviours, especially in those aiming to reduce or avoid activity in pain's presence, which demonstrates motivational behaviour, discrepancy loops and environmental management.

In summary, a combination of the models described may go some way to explaining the underlying mechanisms that govern pain behaviour, pain perception and pain-emotion relationships when individuals experience discrepancies that impact upon their identity. However, an individual's motivation to reduce disparity depends upon how enmeshed their identity has become with pain (Sutherland & Morley, 2008).

#### *1.5.4 Identity Enmeshment*

In an attempt to understand the cognitive bias noted within chronic pain populations, Pincus and Morley (2001) proposed 'The Schema-Enmeshment Model'. They suggested that patients with chronic pain, especially those demonstrating enmeshment, pay close attention to pain and illness related stimuli, resulting in an information processing bias. Schemas "contain a stored body of knowledge which interact with task demands for attending to and disambiguating stimuli and for encoding and structuring retrieval of information" (Pincus & Morley, 2001, p.607). 'Enmeshment' is defined by the process of multiple schema activation, whereby the activation of several schemata means that they become incorporated into each other (Pincus & Morley, 2001). For example, when an individual experiences chronic pain, pain schemas are activated alongside schemas concerning illness, recovery and the self. As can be seen in Figure 3,

the extent to which distress is experienced is dependent upon how closely these concepts overlap, or are activated cumulatively. Conversely, should pain and illness schemas become integrated, and self-schema remain protected, individuals experience less associated distress – their self-concept/sense of who they are remains intact in spite of chronic pain. Arguably, it is imperative to prevent the integration of the self into pain so to prevent greater distress.



**Figure 3:** Overlap of self, pain, and illness schemas (from Pincus & Morley, 2001).

The literature notes associations between pain enmeshment and acceptance, implying that those who accept their pain maintain a willingness to engage in action that is satisfying and meaningful (McCracken *et al.*, 2004). As such, research notes that pain acceptance is associated with lower pain intensity, less pain-related anxiety and avoidance, less depression, less physical and psychosocial disability and greater functioning (McCracken, 1998). Morley, Davies and Barton (2005) and Sutherland and Morley (2008) found that with greater acceptance, identities were less enmeshed, meaning that the more accepted pain is, the more hoped-for self attributes can be achieved, which also predicted depressive magnitude. This may suggest that individuals who accept their pain have less pain enmeshed identities. However, we do not know whether this is moderated by age.

Given the generational influence upon pain, is it possible that older adults, who expect and accept pain and view themselves as younger, may not integrate the ‘self-schema’ with pain and illness schemas. This may be explained by the suggestion that expected physical decline and expected pain do not cause as pronounced autobiographical disruption to the same extent as in younger adults. This present research will attempt to investigate whether age (chronological and/or perceived) moderates how enmeshed individuals become with chronic pain and whether older adults report a closer proximity

to what they hope for and a greater remoteness from what they fear compared to younger adults in chronic pain.

#### *1.5.5 Centrality: When pain is integrated into identity*

Berntsen, Willert and Rubin (2003) have noted associated psychopathology when identity becomes centralised with a significant trauma. It has been proposed that chronic pain can be considered such a trauma and becomes a reference point for an individual, influencing the attribution of other events and future expectations. Likely outcomes of this process include rumination, avoidance, unnecessary worries, and attempts to avoid similar events or painful experiences (Berntsen, Willert & Rubin, 2003; Perri & Keefe, 2008).

Research in other chronic health conditions (e.g., diabetes) has produced interesting thoughts about identity and chronic illness, suggesting individuals construct self-concepts from unfolding experience (Jones, Farina, Hastorf, Markus, Miller & Scott, 1984, p. 115), transforming from healthy to sick identities (Charmaz, 1991), running congruent to 'The Schema Enmeshment Model (Pincus & Morley, 2001). Jones *et al.* (1984) also suggests that when conditions are viewed as stigmatizing, individuals experience more difficulty integrating illness into their self-concepts. Charmaz (1991) suggests variability in the integration of illness into identity - those who make it a defining part of themselves and those who attempt to contain illness by preventing intrusion and interference, and essentially disregard stigma (Jones *et al.*, 1984). Therefore, individuals vary in the extent to which they define themselves by their illness, or how central or enmeshed it becomes. Furthermore, given that depression has been found to be less associated with discrepancies in self-concepts (Kindermans *et al.*, 2010) and does not appear to change as a function of age (Magni, Marchettib, Moreschib, Merskeyc, & Rigatti Luchinib, 1993) this may further indicate a lack of centrality in older people, given that depression and self-esteem are so closely related, especially when research indicates the active dissociation of older adults from their peers and the active endorsement of negative old age stereotypes (Barak, 2009; Weiss & Lang, 2012).

Conversely, authors also suggest that integrating illness into identity has value (e.g., Wiebe, Berg, Palmer, Korbel & Beveridge, 2002). Discounting chronic pain as less central may relate to good mental health but could relate to poor self-care, potentially affecting overall physical health. This is interesting as this runs parallel to research that indicates that older people seek less medical intervention and complain less about their pain (Riley *et al.*, 2000; Weiner *et al.*, 2004; Molton *et al.*, 2007). Wiebe *et al.* (2002) posit that illness integration and its value depends upon one's attitude toward illness (whether positive or negative), suggesting integration with negative evaluation would be associated with poorer health outcomes, whereas integration with positive evaluations (or

less negative) may have fewer negative health consequences, which, again, may be important for older persons who dissociate from their age group and comply with medical regimens.

Previous work on trauma salience and event centrality indicates that their impact on subjective wellbeing is rare, compared to positive or neutral events (Diener & Diener, 1996). Consistently, many people seem to remember more positive than negative events from their lives (Walker, Skowronski, & Thompson, 2003). However, events are not always positive (e.g., marriage) but negative (e.g., ill health, physical decline, retirement, reduced role importance or contribution to society), and contrasting research (e.g., Porter & Birt, 2001; Reviere & Bakeman, 2001; Berntsen, Willert & Rubin, 2003; Rubin, Feldman, & Beckham, 2004) suggests trauma memories and highly stressful events are also well remembered. Berntsen and Rubin (2007) argue that remembering traumatic memories has maladaptive consequences (i.e., symptoms of traumatisation). Pillemer (1998, p.74) describes these as “lasting reminders of the way things are, which can be used to validate current beliefs and feelings, and guide thoughts and behaviour”. Furthermore, Tversky and Kahneman’s (1973) ‘availability heuristic’ is related to the role of memories in personal judgements, in that we judge the frequency and probability of events by the ease at which they can be retrieved from memory. However, because trauma memories, like positive memories, are highly accessible, people may overestimate the frequency of negative events and the likelihood of being traumatized again which drives worry, rumination and avoidance. Pillemer (1998) suggests several possible functions of memories for important events, which are characterised by their importance, definiteness and brevity (p. 27). These form turning points in a person’s life and interrupt, affect or redirect the flow of a person’s life, which may provide insight into an individual’s choices and life direction. Janoff-Bulman (1988) suggests that a traumatic or stressful life episode profoundly changes a person’s outlook and continues to do so, due to its accessibility and activation in response to internal and external cues (Berntsen, 2001). Arguably, a diagnosis (e.g., one that is pervasive and protracted like chronic pain) would have an intrusive impact upon an individual’s life-script, which provides a developmental framework or timeline (Luborsky, 1993) influencing how a person conceives themselves in time, which is also influenced by culturally expected roles and health transitions. Furthermore, chronic pain’s protracted nature could be considered doubly traumatising for an individual. Thus, it can be seen how the continuing nature of pain, its diagnosis and impact, could form the basis of a major turning point in one’s life story, forming a reference or anchor point for one’s identity. Therefore, the trauma becomes causally related to stable characteristics of the self that pertain across situations and impact upon attribution styles, similar to the Schema-Enmeshment Model (Pincus & Morley, 2001)

Given differences between young and old chronic pain populations, there may be differences in the centrality of chronic pain, which may further elicit differences in self-guides and generational expectations, pain attitudes and coping strategies.

### **1.6 Measuring Pain Identity Enmeshment & Centrality**

Given that this research aims to investigate the relationship of ‘possible selves’ (identity) enmeshment in conjunction with identifying centrality between age cohorts, this section discusses the measurement of these constructs.

#### *1.6.1 The Possible-Selves Interview*

Hooker and Kaus (1994) attempted to measure ‘possible-selves’ by developing ‘*The Possible-Selves Interview*’. The interview generates measures related to two theoretical perspectives – Self-Discrepancy Theory (Higgins, 1987) and The Self-Pain Enmeshment Model (Pincus & Morley, 2001). The interview requires participants to generate a list of possible hoped-for (what they hope to be like in the future) and feared-for selves (what they fear becoming in the future), which are rated on a 7 point Likert scale in terms of how likely participants feel able to achieve or prevent their hoped-for/feared-for selves (efficacy dimension) and how likely their hoped-for/feared-for selves are to occur (expectancy dimension).

The original interview has since been adapted by Morley and colleagues (2005), whereby individuals are first asked to self-generate up to 10 hoped-for and feared-for characteristics, and then consider each self-description/characteristic to ascertain how conditional each is in the presence of pain (conditionality). Therefore, individuals are asked if hoped-for characteristics remain possible should pain remain in their lives. Similarly, for the feared-for self-characteristics, individuals are asked whether these are possible in the absence of pain. Enmeshment is determined by the proportion of each characteristic on the presence or absence of pain (i.e., the number of ‘no’ responses as a proportion of the total number of responses given). Morley and colleagues also included a measure of proximity, which measures the closeness or remoteness from hoped-for and feared-for selves (Sutherland & Morley, 2008). In this adapted version, participants approximate how close they feel to self-characteristics, which they respond using a 7 point Likert scale, which generates a proximity mean score.

A further adapted version of ‘*The Possible-Selves Interview*’ has since been developed (Wells, 2010), which provides individuals with a reservoir of feared-for (n = 25) and hoped-for (n = 25) self-descriptors rather than participants self-generating these. The feared-for and hoped-for characteristics provided have been developed based upon extensive research with chronic pain populations (Morley, Davies & Barton, 2005; Fogg, 2007; Sutherland & Morley, 2008). Each individual can select up to 10 hoped-for and

feared-for characteristics, or generate their own. This version was found to increase the number of self-descriptors chosen, and reduce participant burden.

### 1.6.2 *The Centrality of Event Scale*

The recent development of '*The Centrality of Event Scale*' (CES - Berntsen & Rubin, 2006) in post-traumatic stress disorder (PTSD) has prompted consideration about the integration of chronic pain related experience into identity, which runs parallel to the idea of enmeshment within the 'Possible-Selves' literature.

*The CES* measures the extent to which a stressful life event forms a reference point for self-identity and the attribution of other life events or experiences. The measure was developed to assess the impact and integration of trauma in PTSD, and correlated successfully with both PTSD and depressive symptoms (Berntsen & Rubin, 2006). The original authors contend that traumatic memories, which are highly accessible, vivid and on-going, provide individuals with meaning, structure self-narratives and stabilise and anchor our self-conceptions.

*The CES* utilises the idea that negative life events produce negative trauma memories which form reference points for the organization of other, albeit, less salient personal experiences and are harmful to our mental health (Berntsen, Willert & Rubin, 2003) and influence the attribution of events and expectations of future events. Berntsen and colleagues (2006) conclude that rumination, unnecessary worry, and compulsive attempts to avoid similar events are likely outcomes when centrality is high, which fits well with Sullivan and colleagues' (1995) conceptualisation of catastrophising, and the active avoidance and motivation to avoid what is feared as suggested by the 'Possible Selves' and 'Self-Discrepancy' literature (e.g., Carver, Lawrence & Scheier, 1999).

*The CES* is a 20-item assessment instrument measuring 3 aspects of the centrality of chronic pain as a life event (e.g., the extent to which a person considers a stressful event as a turning point in their life, which forms a reference point for their identity and impacts upon the attribution and meaning of other life experiences). Each item is rated by participants on a Likert scale from 1 to 5 (1 = "Totally disagree" and 5 = "Totally agree"), with higher total scores indicating greater autobiographical integration of chronic pain into identity.

Recent research has successfully applied *The CES* measure to chronic or persistent pain (e.g., Perri & Keefe, 2008). Clinical observations suggest a variety of reasons concerning the importance of understanding pain centrality as a notable life event (Palyo & Beck, 2005), including reports that chronic pain is considered a major life turning point, where chronic pain produces a cascade of other life events (e.g., reduced abilities to perform daily activities, engage in normal relationships, and fulfil work and

life responsibilities) and affects how events are viewed and become key components of identities and self-conceptions.

Perri and Keefe (2008) found that those identifying pain as a stressful life event were more likely to experience life interference, psychological distress and higher pain intensity. Perri and Keefe (2008) concluded that pain can be a significant turning point in a person's life, can become part of one's identity, and that using *The CES* may improve our understanding of people with chronic pain conditions. However, Perri and Keefe's (2008) broad sample did not specifically target older people, nor did they compare age groups. This research aims to investigate this using *The CES* across age cohorts and to determine if centrality and enmeshment are associated constructs.

## **1.7 Summary & Research Aims**

### *1.7.1 Summary*

Undeniably, chronic pain threatens normal functioning and is associated with anxiety, depression and cognitive processes (e.g., catastrophising, hyper-vigilance, information processing bias) which threaten the success of psychological and medical treatments and compromise identity.

In the context of these austere times, and the demand from ever expanding and aging population and where chronic pain conditions are becoming more evident in younger populations, understanding the potential differential needs of chronic pain populations, and potentially adapting interventions over the course of the lifespan, is essential.

The literature suggests that chronic pain can compromise identity by halting developmental trajectories (autobiographical disruption), meaning life aspirations and personally relevant goals require adjustment. Chronic pain has been considered a significant salient trauma, becoming a reference point for the appraisal of other life events and integrated into autobiographical memory (centrality). Additionally, chronic pain can also become 'integrated' with other aspects of ourselves (the self) and our understanding of illness, bringing us closer to what we fear becoming and further away from what we hope to be like in the future, which further drives psychopathology and identity enmeshment.

The literature notes differences between older adults and younger adults in terms of health expectations, pain thresholds and tolerance, attitudes towards pain and levels of acceptance, generational and cultural influences, normative trajectories of ontogenesis, perceived and chronological age, and pain perception. However, no studies have explored the difference between adults and older adults in terms of how 'central' and enmeshed identities become with pain, and whether age (chronological age, perceived age and the

discrepancy between these) moderates this process more than other variables in pain adjustment.

The pain-age literature, for some time, has been ‘misled’ by the plausible hypothesis that with declining physical health, reduced social opportunities and recognition of the finite nature of life in older adults would provoke lowered self-efficacy, perceived control and increased depression and psychopathology, and yet these relationships have been weak and inconsistent when investigated (Brandtstadter & Rothermund, 2002). It seems our explanations and expectations of pain-age adjustment do not fit smoothly with the older adult chronic pain population. Given that pain-identity enmeshment has disabling consequences in terms of pain intensity, report, interference and psychopathology, this is clearly an area for research, potentially allowing for the analysis of circumstances where centrality and pain enmeshment might occur, or to determine whether advancing age is protective and acts as a buffer against pain-identity enmeshment, associated psychopathology and poor pain adjustment. This could be invaluable for medical, psychological and systemic intervention and early identification and treatment to prevent or reduce distress and disability.

### *1.7.2 Research Aims*

This thesis aims to explore the relationship between age and pain-identity compromise and adjustment. To assess this, participants will be recruited from across the lifespan to explore the moderating and predictive value of age in relation to pain-identity enmeshment and adjustment. Chronological and perceived age (and the disparity between the two) will be explored in relation to identity enmeshment by employing *The CES* (Berntsen & Rubin, 2006). Previous research (e.g., Keefe & Perri, 2008) has used *The CES* to assess ‘centrality’ in chronic pain patients, finding associations with disability, distress and poorer functioning, but this has not been investigated in relation to age. To further explore pain identity and age relationships, ‘*The Possible Selves Interview*’ (Markus & Nurius, 1986), specifically the abridged version (Wells, 2010), will also be used to identify discrepancies between hoped-for and feared-for self-descriptions between age groups. In addition to *The CES* and *The Possible-Selves Interview*, and to test the moderating value of age in pain-identity enmeshment and adjustment, several other variables will also be measured (e.g., catastrophising, acceptance, locus of control, pain intensity and level of interference) in an attempt to isolate the predictive value of age in terms of pain-identity enmeshment and adjustment.

### *1.7.3 Research Hypotheses*

As a result of the review of the literature, the following research hypotheses were generated:



1. Older adults will perceive themselves to be younger in the context of chronic pain compared to younger adults who will perceive themselves as older.
2. Perceived age will outperform chronological age in terms of associations with variables of distress and adjustment, pain-identity enmeshment and proximity and centrality.
3. Older perceived ages will be associated with greater enmeshment and centrality
4. Greater perceived age will be associated with poorer pain adjustment.
5. Centrality and enmeshment will inter-relate

## CHAPTER 2: METHOD

### 2.1 Sample Selection

The introductory part of this thesis has focused upon generalised chronic pain, however, it was deemed appropriate to focus on a specific diagnosis to investigate the impact of chronic pain upon identity across the lifespan. To reduce the amount of variance within the research sample, osteoarthritis (OA) was considered.

Arthritis is a common chronic pain condition, and considered an inflammatory musculoskeletal condition. It is estimated to affect more than 10 million people within the UK (Arthritis Care, 2012), and many more internationally (Woolf & Pfleger, 2003). Arthritis presents commonly as swelling, damage and tenderness to the joints, in conjunction with joint movement restriction, fatigue, disfigurement and chronic pain (Petty, Southwood, Manners, *et al.*, 2004; Prince, Otten, & van Suijlekom-Smit, 2010). Individuals can experience protracted severe pain and physical and occupational limitations, in conjunction with the psychological and emotional consequences associated with chronic pain.

As a common form of arthritis, affecting both the larger and smaller joints (e.g., hands, feet, and hips); OA is considered a result of general 'wear-and-tear' and joint erosion. OA can develop in younger populations, and as a result of traumatic injury, obesity and sedentary lifestyles. It is estimated that more than 30% of women have some amount of OA by the age of 65 years (National Academy on an Aging Society, 2000), and is commonly considered a condition of the elderly. Although incurable, physical therapy is often used to strengthen muscles around joints in conjunction with analgesia to manage symptomatic pain, which, given the progressive nature of the condition, can become continuous. Surgical intervention can be another, albeit invasive, option (e.g., joint replacement) to assist individuals with the condition.

OA is a readily available study population, affecting individuals across the lifespan, and is chronic and disabling (i.e., resulting in physical limitations, psychological distress and reduced social and occupational functioning). Additionally, individuals with chronic pain conditions with a childhood genesis adapt well, experience less psychological distress and co-morbid psychological problems, and are able to engage in social activities and with normative levels of energy and functioning (Laaksonen & Laine, 1961; Scott, Ansell & Huskisson, 1977; Wirrell, Lang & Canfield, 1995; Peterson *et al.*, 1997).

With this in mind, participants with chronic pain conditions of a childhood genesis were omitted from this research, which focused upon OA in adult and older adult populations. The prevalence of OA is relatively uncommon below the age of 30 (Lawrence, Helmick & Arnett, *et al.*, 1998) which provided a cut-off age for the research sample. To capture older adults with OA there was no upper age limit.

## 2.3 Study Design

This research is a single group multiple-measure observational design. This design has been previously used successfully within the literature to compare chronic pain age cohort differences (e.g., Riley *et al.*, 2000). This design is being used to observe and describe the association between participants' identity and age in the context of chronic pain, however, it does not endeavour to establish causal relationships between these variables. Collected data was analysed using correlations to test predicted relationships between age and variables associated with adjustment and identity in the context of chronic pain.

When employing multiple regression analysis, Tabachnik and Fidell (2007) argue that sample size calculations should be determined by using the following algorithm:  $104 + p$  (where  $p$  is the number of independent variables). Previous research, (Perri & Keefe, 2008) identified three independent variables in relation to pain centrality (pain intensity, distress and life interference). Further studies have also indicated other variables related to pain identity including acceptance and the 'possible selves' construct (Hooker & Kraus, 1994; Morley, Davies & Barton, 2005; Kindermans, *et al.*, 2010). Therefore, based upon these findings this would suggest a sample size of 110 participants was required. A power calculation (G power version 3.0.8) was also used to identify the required number of participants for correlation between variables and age. A large effect size (0.8) was anticipated, therefore a total of 90 participants were required. Previous authors (Morley, Davies & Barton, 2005; Sutherland & Morley, 2008) have noted medium effect sizes with samples of 59 to 89 chronic pain patients. A total of 90 participants were recruited to participate in the research who met the necessary inclusion criteria.

### 2.3.1 Ethical Approval

Ethical approval was attained from the Leeds East Research and Ethics Committee in conjunction with Leeds Teaching Hospitals Trust Research and Development Department. Approval letters can be found in Appendix 1.

### 2.3.2 Additional Research Caveat & Participant Consent

The Musculoskeletal Service at Chapel Allerton Hospital (Leeds) is also researching multiple joint pain and applied for 2 other questionnaires to be added to this research (The Pain Mannequin and Pain Intensity VAS) and required access to Brief Pain Inventory (BPI) Questionnaire data already collected as part of this research. This information and additional measures were also submitted for ethical approval for transparency with the caveat that data would only be shared once this research attained ethical approval. As a result, consent and participant information sheets explained this

research and the protocol for data sharing, which participants could consent to or opt out from.

## **2.4 Participant Selection**

Participants were recruited from the Musculoskeletal Unit, Chapel Allerton Hospital (Leeds). The Musculoskeletal Team were well versed in the study and identified and approached patients fulfilling required inclusion criteria. Any chronic pain patient over the age of 30 years was eligible for participation, however, efforts were made to ensure a variety of ages were recruited to attain a spread of ages to investigate age and pain-adjustment relationships.

### *2.4.1 Inclusion Criteria*

- 30 years and older (no upper age limit).
- Diagnosed with Osteoarthritis (duration >6 months).
- English speaking (language fluency to complete research measures).

### *2.4.2 Exclusion Criteria*

- Alcohol and illicit drug abuse.
- Any evidence of malignant pain (e.g., cancer).
- Known learning disability or cognitive deficit (e.g., mild cognitive impairment/dementia).
- Non English speaking.
- Currently experiencing a psychotic episode.
- Juvenile Idiopathic Arthritis (JIA) or other chronic pain condition developed in childhood or of a congenital nature.

## **2.5 Study Measures**

In addition to demographic data, descriptive and clinically relevant data (e.g., age, gender, pain duration) were collected. The measures used are outlined below. All measures used are presented within the Appendices.

### *2.5.1 Demographic Information*

The following demographic data were collected: age, occupation, education level, diagnosis, pain duration, pain site(s), current and previous pain treatments, relationship status and ethnicity. This information was used to index the sample, yet controlled for during subsequent analysis phases.

## 2.6 Identity Measures

To measure the impact of chronic pain upon identity, 2 measures were employed to assess pain identity enmeshment: *The Hoped-for* and *Feared-for Selves Interview*. A further measure was administered to assess the integration (centrality) of chronic pain into identity: *The Centrality of Event Scale*.

### 2.6.1 *The Centrality of Event Scale (CES: Berntsen & Rubin, 2006):*

Pain identity was examined using *The CES* (Berntsen & Rubin, 2006). *The CES* is a 20-item assessment instrument measuring 3 aspects of the centrality of chronic pain as a life event (e.g., the extent to which a person considers a stressful event as a turning point in their life, which forms a reference point for their identity and impacts upon the attribution and meaning of other life experiences). Each item is rated by participants on a Likert scale from 1 to 5 (1 = “Totally disagree” and 5 = “Totally agree”), with higher total scores indicating greater autobiographical integration of chronic pain into identity.

### 2.6.2 *The Possible-Selves Interview:*

As per Morley, Davies and Barton (2005), Higgins (1987) and Hooker and Kaus (1994) ‘The Possible-Selves Interview’ requires participants to select personal characteristics which may describe themselves in the future, in terms of what they hope (hoped-for selves) and what they fear becoming (feared-for selves). This research employed the abridged version (Wells, 2010) to reduced participant burden. The interview is used to investigate identity in relation to pain and age, in terms of disparity or proximity between hoped-for and feared-for positions, generating scores of enmeshment, proximity, self-efficacy and expectancy. Previous work notes the ease at which participants select self-descriptors in relation to what they hope or fear, however, previous work notes participants can struggle to generate abstract (future) self-descriptors independently, which provides a rationale for using this version, whereby participants can select hoped-for and feared-for self descriptors or generate their own. The procedure for each interview is as follows:

### 2.6.3 *The Feared-for Selves Interview:*

The procedure for *The Feared-for Self Interview* is based on the work by Hooker and Kaus (1994), Morley, Davies and Barton (2005) and Wells (2010) whom adapted the interview for use with chronic pain populations. Participants are first explained the concept of ‘feared-for selves’ which they are asked to consider in relation to themselves. Each participant is then provided with 25 cards, each displaying a potential feared-for self-description. The 25 feared-for self-characteristics have been identified by a content analysis from the chronic pain literature (Goossens, Kindermans, Morley, Roelofs,

Verbunt, & Vlaeyen, 2010) and are: Moody, Insecure Frustrated, Frightened, Disabled, Sombre, Nervous, Inferior, Bitter, Pessimistic, Tired, Lonely, Aggressive, Unhappy/Depressed, Worrying, Short-tempered, Not wanting to spend time with others, Bossy, Uncared for, Self-obsessed, Jealous, Unmotivated, Unreliable, Complaining, and Demented. Should participants feel that the self-descriptors provided are non-applicable they can generate these independently. Participants are then instructed to select 10 self-descriptors that they fear becoming in the future. Each characteristic is then recorded. Each participant is then asked the following questions:

1. "Is it possible to be like this without pain?" to which each participant is asked to respond Yes or No.
2. "How close do you currently feel you are to this characteristic?" to which each participant is asked to respond to this question using a 7 point Likert scale (where 1 = I am just like this and 7 = I am the complete opposite of this).
3. How capable do you feel of prevent these characteristics happening in the future? To which each participant is asked to respond to this question using a 7 point scale (where 1 = not at all and 7 = definitely).
4. How likely do you feel of these characteristics happening in the future? To which each participant is asked to respond to this question using a 7 point scale (where 1 = very unlikely and 7 = very likely).

The first question ascertains the conditionality of each feared-for characteristic selected upon continued chronic pain. Feared-for selves enmeshment is calculated by dividing the number of 'no' responses by the number of total feared-for self-characteristics selected. This method of calculating feared-for enmeshment has been employed by a variety of research studies (e.g., Davies, 2002; Sutherland, 2004; Wells, 2010), and generates a score between 0-1, with a total score of 1 indicating total feared-for enmeshment.

The second question ascertains the proximity of feared-for selves, by asking participants to respond to the how close they feel they are currently to each feared-for characteristic they select. Proximity scores are ascertained by generating a mean score for each participant by totalling the number of proximate scores for each of their selected feared-for characteristics generating a score between 0 and 7.

Participants are then asked to rate how capable they feel of preventing their feared-for characteristics occurring in the future which provides a scale of their self-efficacy. They are then asked to rate how likely they believe their feared-for characteristics will happen in the future which generates a scale of their level of expectancy.

#### 2.6.4 *The Hoped-for Selves Interview:*

The procedure for *The Hoped-for Selves Interview* is based on previous work by Hooker and Kaus (1994), Morley, Davies and Barton (2005) and Wells (2010). The 25 hoped-for self characteristics were initially generated from previous chronic pain research (e.g., Fogg, 2007; Goossens *et al.*, 2010) and are: Being Treated As Equal, Creative, Caring, Active, Confident, Easy going, Hardworking, Happy, Friendly, Fit, Helpful, Good listener, Good Family Member, Content, Good Sense of Humour, Healthy, Independent, Inventive, Optimistic, Sociable, Being Patient, Outgoing, Positive, Wealthier, and Understanding. The methodology for the administration of this measure is the same as *The Feared-for Selves Interview*, although the questions asked at the end of the interview differ. Once 10 hoped-for self-characteristics have been selected by each participant and recorded from the 25 provided, or self-generated, the participant is then asked for each characteristic the following questions:

1. “Could you be like this in the future with pain?” - To which each participant and asked to respond Yes or No.
2. “How close do you currently feel you are to this characteristic?” - To which each participant is asked to respond to this question using a 7 point Likert scale (where 1 = I am just like this and 7 = I am the complete opposite of this).
3. How capable do you feel of prevent these characteristics happening in the future? To which each participant is asked to respond to this question using a 7 point scale (where 1 = not at all and 7 = definitely).
4. How likely do you feel of these characteristics happening in the future? To which each participant is asked to respond to this question using a 7 point scale (where 1 = very unlikely and 7 = very likely).

The first question ascertains the conditionality of each hoped-for characteristic selected upon continued chronic pain. Hoped-for self enmeshment is calculated by dividing the number of ‘no’ responses by the number of total hoped-for self characteristics selected. This method of calculating enmeshment has been employed by a variety of research studies (e.g., Davies, 2002; Sutherland, 2004; Wells, 2010), and generates a scores between 0-1, with a total score of 1 indicating total hoped-for enmeshment.

The second question ascertains the proximity of hoped-for selves by asking participants to respond to how close they feel they currently are to each characteristic they select. Proximity scores are ascertained by generating a mean score for each participant by totalling the number of proximate scores for each of their selected hoped-for characteristics generating a score between 0 and 7.

Participants are then asked to rate how capable they feel of preventing their hoped-for characteristics occurring in the future which provides a scale of their self-efficacy. They are then asked to rate how likely they believe their hoped-for characteristics will happen in the future which generates a scale of their level of expectancy.

## **2.7 Pain Measures**

To measure the impact of chronic pain upon participants' daily functioning and pain perception, five measures were administered to assess perceived pain control, pain catastrophising, pain acceptance, pain intensity and perceived level of interference, as these constructs are noted from the literature to impact upon pain adjustment and so supports the rationale for their inclusion within this research study.

### *2.7.1 Locus of Control Visual Analogue Scale (LOC VAS):*

Given that the literature notes associations between locus of control and disability, distress, coping and functioning (e.g., Arrass, Wright, Jusue, Tejedor & Calvo, 2002) this was measured by using a visual analogue scale with anchor points from 'no control' to 'complete control'. VAS' are commonly used within psychological research (McCormack, Horne & Sheather, 1988) allowing participants to locate themselves on construct continua. Using VAS' were deemed appropriate to reduce participant demand due to the large number of questionnaires being used. The preferred style of VAS is a 10cm continuum which provides a method of scoring "the exactness of experiences that can be difficult to capture verbally" (Zealey & Atkin, 1969, p.996).

### *2.7.2 The Pain Catastrophising Scale (PCS: Sullivan, Bishop & Pivik, 1995)*

Given that the literature also notes that distress, pain intensity and level of disability are interrelated with catastrophising (e.g., Borsbo, Gerdle & Peolsson, 2010) this research employed *The PCS* (Sullivan, Bishop & Pivik, 1995). *The PCS* is a 13 item self-administered questionnaire designed to measure the constructs of rumination, magnification and helplessness, producing scores for each domain with higher scores indicating heightened domain specific behaviour/thoughts. Items are rated by participants on a scale of 0-4 (0 = not at all, 4 = all of the time). *The PCS* is a well validated and efficient measure. *The PCS* has demonstrated high internal consistency and high construct validity for chronic pain populations (Osman, Barrios, Gutierrez, Kopper, Merrifield & Grittmann, 2000).



### 2.7.3 *The Chronic Pain Acceptance Measure (CPAQ: McCracken, Vowles & Eccleston, 2004):*

*The CPAQ* was used to assess participants' acceptance/valance of their pain. Consisting of 20 items, participants are asked to rate their responses to statements using a 6 item Likert scale. The scale contains two sub-scales: activity engagement and pain willingness. Activity engagement has 11 items measuring activity engagement in spite of pain, with higher scores indicative of a participant's pursuit of activities despite being in pain, and pain willingness has 9 items measuring a participant's attempt to control their pain, with higher scores indicative of participants being less invested in pain control. Scores of all items are summed to give an overall acceptance score. This measure has demonstrated good reliability (Cronbach's alpha = 0.85) and validity, having been compared to other measures of functioning and psychological distress (McCracken, Vowles & Eccleston, 2004).

### 2.7.4 *The Brief Pain Inventory (BPI Short Version: Cleeland & Ryan, 1994):*

*The BPI* (Short Version) was developed by the Pain Research Group of the World Health Organisation. To reduce the level of burden upon participants, the shorter version of *The BPI* was employed and takes approximately five minutes to complete. The short version of *The BPI* is a self-report/interview pain assessment measure, originally developed for use with cancer patients, although has been used successfully to measure pain in a variety of differing chronic health conditions (e.g., OA). *The BPI* measures the intensity of pain (sensory dimension) over 4 items using a Likert scale and the interference of pain in the patient's life over 7 items using a Likert scale (reactive dimension). The measure does not have a scoring algorithm, yet arithmetic mean scores for pain intensity and pain interference can be generated from the relevant items within the measure. It also asks the patient about pain relief (i.e., what medication is used), pain location, pain quality, and their perception of the cause of pain. *The BPI* is described by the authors as 'a powerful tool' and has demonstrated reliability and validity with Cronbach alpha reliability ranging from 0.77 to 0.91 (Cleeland & Ryan, 1994), and has been widely used cross culturally to assess pain and investigate treatment effectiveness. Additionally, the BPI is widely used within academic research.

### 2.7.5 *Pain Intensity Visual Analogue Scale (VAS):*

A pain VAS was used to assess pain intensity, whereby participants were asked to indicate, on a standard length line (10cm) the level of pain intensity they had experienced over the last 7 days. The use of VAS for pain intensity was considered appropriate given the large number of questionnaires and to reduce participant burden. Previous research has also validated their usefulness (Von Korff, Ormel, Keefe &

Dworkin, 1992). Research indicates that when assessing pain intensity, scores below 5 (50mm) are indicative of low intensity pain, whilst scores above 5 (50mm) indicate higher pain intensity (Von Korff, Deyo, Cherkin, & Barlow, 1993).

## **2.8 Affective Distress**

*2.8.1 The Hospital Anxiety and Depression Scale (HADS: Zigmond & Snaith, 1983):*

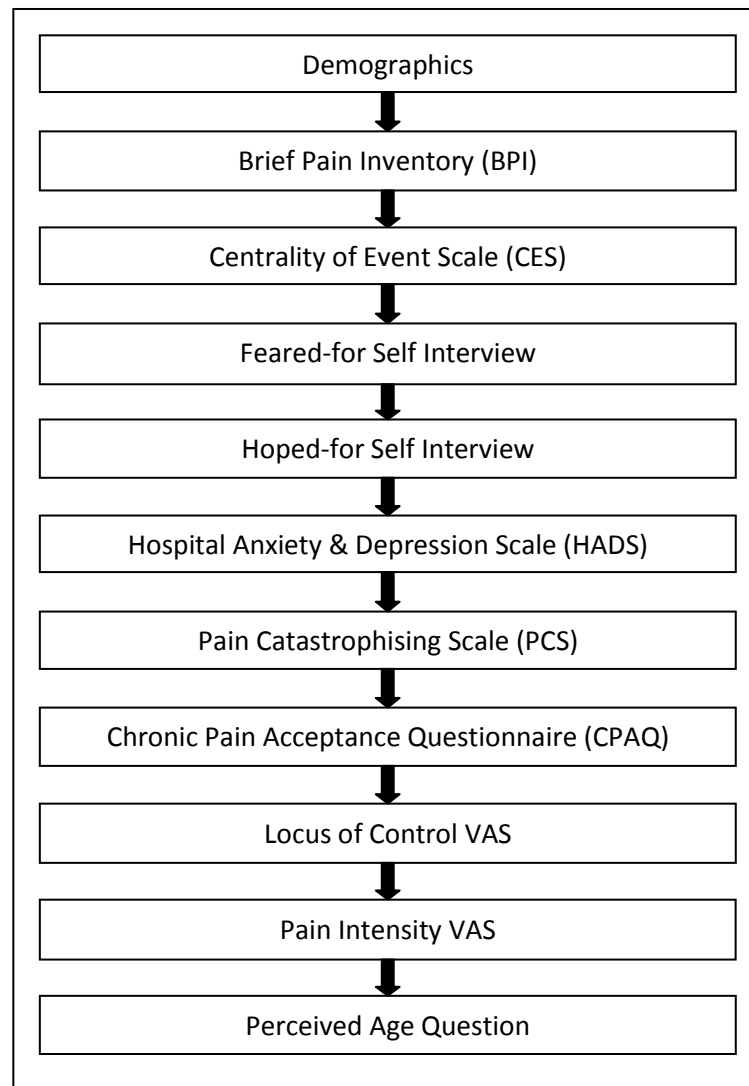
To identify affective distress, a specific measure of wellbeing was required as previous research suggests associations between distress and chronic pain (Devlieger, Crombez & Eccleston, 2006; McCracken & Eccleston, 2003). Previous research has employed the McGill Pain Questionnaire and Beck Depression Inventory, although such measures contain somatic items which can be confused with distress. Furthermore, it is also worthwhile to determine both anxiety and depression and overall distress. To generate and identify participant need *The HADS* was used (Zigmond & Snaith, 1983). The measure is widely used as a clinical measure of anxiety and depression in clinical, outpatient and community settings, consisting of 14 items (50% measuring anxiety and 50% measuring depression). *The HADS* is free from somatic items which could bias the assessment of anxiety and depression in a chronic pain sample (Morley, *et al.*, 2005). A further rationale for the administration of *The HADS* was its efficiency. The measure has demonstrated good reliability and validity for measuring and identifying depression and anxiety in individuals with health conditions (Zigmond & Snaith, 1983).

## **2.9 Perceived Age**

Upon completion of the interview, participants were asked their perceived age to identify and investigate any discrepancy from their chronological age in the context of chronic pain, given that subjective age is affected most by compromised health and rivals the predictive capacity of chronological age (Richardson, Ong & Sim, 2006; Hubble & Russell, 2009).

## **2.10 Schedule of Measure Administration**

The following administration schedule was used. The order was intended to avoid introducing potential methodological biases (i.e., ordering effects). Given the potential influence of drawing participant attention to their perceived control, acceptance and affective distress, demographic information and perceived pain interference were collected first. This was followed by measures investigating identity, with pain perception, followed by perceived control and acceptance and perceptions of perceived age.



**Figure 4:** Schedule of Measure Administration.

### 2.11 Procedure

Participants were recruited from The Musculoskeletal Unit at Chapel Allerton Hospital, Leeds. Participants were identified by clinicians as per inclusion and exclusion criteria and were provided participant information by the clinician during clinical time, or at a later date by the researcher. Persons wishing to take part in the study were provided with the option of being seen at Chapel Allerton Hospital, at The University of Leeds or at the participant's home. During this time, informed consent from each participant was attained. The parameters of consent, confidentiality limitations, and data management were discussed. Consent information also outlined the voluntary nature of the research, how the research would not impact upon a participant's current or future clinical treatment, and explained their right to withdraw at any time. Furthermore, participants were given the opportunity to ask any questions about the study. All participants were requested to sign a consent form, but were invited to discuss consent, again, to elucidate

any misunderstandings about consent, confidentiality or withdrawal parameters. Patient information and the consent form used in this research are presented in Appendix 2 and 3.

Regarding confidentiality, participants were informed prior to beginning the interview about confidentiality principles applicable to both clinical work and research. Participants were informed of confidentiality limitations and the circumstances under which confidentiality could be broken (e.g., risk). Furthermore, participants were informed that all materials and personal information corresponding to them would be anonymised and allocated a participant number known only to the researcher. The additional research planned by The Musculoskeletal Unit at Chapel Alerton Hospital was also discussed with each participant, informing them, again, of the voluntary nature of this, and that should they consent, data would be only shared upon ethical approval of this further study.

The procedure took approximately 45 minutes to complete. Participants were given the option to take breaks during the interview if fatigued or distressed. During interview transcription and data analysis, identifying details (e.g., names) were transformed to remove any irrelevant personal details and to protect participant anonymity.

## CHAPTER 3: RESULTS

### 3.1 Introduction

This chapter describes and explores the results generated from this thesis research project. The sample is first described (e.g., demographic information and diagnostic information). Age data are then presented (e.g., chronological age, perceived age and the discrepancy between chronological age and perceived age), followed by a description of pain and affect related measures (e.g., Severity, Acceptance and Distress) and measures of identity (e.g., *The CES* and *The Possible Selves Interview*) findings. This section concludes with an examination of the data generated in relation to existing research and tests the main hypothetical conjectures of this study by examining the relationship between age and identity (centrality and enmeshment), an exploration of how measures of identity interrelate, an examination of adjustment in relation to affective distress, acceptance and other variables associated with pain adjustment and identity and finally, adjustment, identity and age are explored using correlation and regression analyses.

#### 3.1.1 Testing for Normal Distribution

The normal distribution of data was explored using histograms, scatterplots, estimates of skewness, stem and leaf modeling, and Kolmogorov-Smirnov tests to identify violations of linearity and homoscedasticity and to identify data outliers. Pearson's Correlation Coefficients ( $r$ ) were used for normally distributed and transformed data. For non-normally distributed data, and where transformation was not possible, nonparametric statistical analysis was used (e.g., Kendall's Tau ( $\tau$ )).

### 3.2 The Sample

#### 3.2.1 Demographic Data

A total of 116 patients meeting inclusion and exclusion criteria were approached to participate within the study between June 2012 and December 2012. All participants were recruited as per the recruitment procedure and were under the care of The Musculoskeletal Unit at Chapel Allerton Hospital, Leeds. A total of 90 (78%) participants with OA and chronic pain were recruited and agreed to participate. Twenty six (22%) participants either declined to participate or were unreachable. No further data was collected with regards to these potential participants.

Eighty six participants (96%) were interviewed at their home, and 4 participants (4%) were interviewed at Chapel Allerton Hospital, as per arrangements with The Musculoskeletal Unit. Interviews were expected to take approximately 90 minutes, although the majority of interviews were completed within 45 minutes.

The sample consisted of 18 (20%) males and 72 (80%) females. Sixty participants (67%) were married, 9 participants (10%) were in a relationship, 9

participants (10%) considered themselves as ‘single’, 7 participants (8%) were divorced, 3 (3%) participants described themselves as ‘cohabiting’ and 2 (2%) described themselves as widowed. The sample varied with regards to occupational status, which was unsurprising given the nature of the research and age distribution of the sample. Thirty Seven (41%) participants described themselves as employed, 35 (39%) participants described themselves as retired and 18 (20%) described themselves as unemployed and receiving incapacity benefit.

### 3.2.2 Education Level

The sample varied with regards to school leaving age. Six (7%) participants reported leaving full time education at 14 years, 53 (59%) participants reported leaving fulltime education at 15-16 years, 14 (16%) reported leaving full time education at 18 years (e.g., secondary/college), and a further 17 (19%) reported having accessed tertiary education (e.g., University or equivalent).

### 3.2.3 Diagnosis

All participants were asked pain related diagnostic information despite already meeting inclusion criteria. Table 1 illustrates diagnostic information and sample frequencies, and although this research aimed to recruit a sample with a finite diagnosis (OA), some participants reported more than one underlying pain related medical condition (range = 1 - 4, M = 1.45, SD = 0.66) and several participants (6%) were unsure of their diagnosis.

**Table 1:** Diagnostic Frequencies

	Frequency	Percentage
Osteoarthritis	80	90
Fibromyalgia	13	14
Hypermobility	5	6
Bursitis	5	6
Degenerative Disc Disease	5	6
Unknown	5	6
Myalgic Encephalomyelitis	2	2
Back Injury (Unspecified)	1	1
Carpal Tunnel Syndrome	1	1
Connective Tissue Disease	1	1
Cyst to spine	1	1
Osteopenia	1	1
Sciatica	1	1
Scoliosis	1	1
Spinal Stenosis	1	1
Spondylosis	1	1
Tendonitis	1	1

### 3.2.4 Pain site(s)

All participants were asked to indicate where they experienced pain related to their chronic pain condition (> 6 months duration). Participants reported pain in a variety of sites (range= 1-21, X = 6.44, SD = 4.16). Table 2 illustrates the various pain sites reported by participants including the percentage of pain sites reported within the sample. The most common pain sites reported included: lower back (66.7%), knees (62.2%), neck (55.6%), shoulders (52.2%) and hips (50.0%).

**Table 2:** Pain site (frequency and % of total sample)

	<b>Frequency</b>	<b>Percentage</b>
Lower Back	60	66.7
Knees	56	62.2
Neck	50	55.6
Shoulders	47	52.2
Hips	45	50.0
Hands	42	46.7
Wrists	35	38.9
Fingers	33	36.7
Feet	30	33.3
Thumbs	29	32.2
Ankles	29	32.2
Elbows	28	31.1
Toes	22	24.4
Balls of feet	18	20.0
Groin	17	18.9
Upper Back	13	14.4
Mid Back	10	11.1
Arms	6	6.7
Chest	5	5.6
Legs	5	5.6
Buttocks	4	4.4

### 3.2.5 Pain Treatments Received

Participants were asked to provide information regarding pain treatments they had received or were receiving. Participants reported using a range of pain treatments and 3 individuals reporting using no treatments at all (range 0 - 6; M = 1.96; SD = 1.059). Table 3 illustrates the frequency of pain treatments used and the percentage within the sample. The most common forms of pain treatment were orally administered analgesia (92.2%), physiotherapy (32.2%) and steroidal injection (27.8%).

**Table 3:** Medication used (frequency and % of total sample)

	<b>Frequency</b>	<b>Percentage</b>
Oral Analgesia	83	92.2
Physiotherapy	29	32.2
Steroid Injections	25	27.8

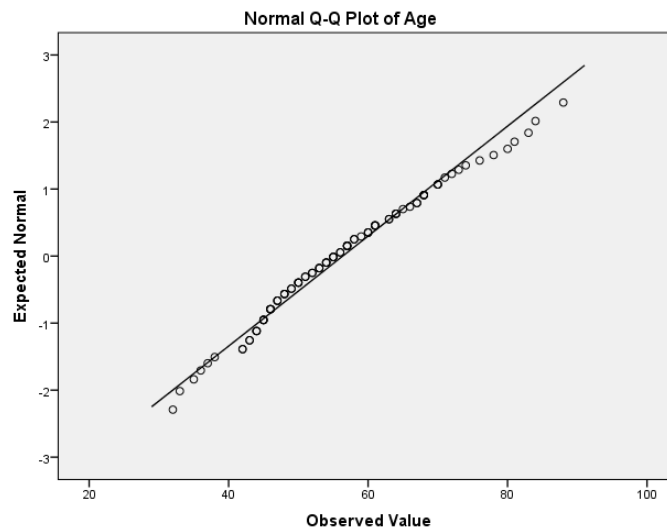
Surgical Intervention	17	18.9
Vitamin Supplements	9	10.0
Analgesia (Patch form)	7	7.8
Analgesia (Gel form)	7	7.8
Hydrotherapy	6	6.7
TENS Machine	3	3.3
Heat Pads	3	3.3
No Treatment	3	3.3
Massage	2	2.2
Acupuncture	1	1.1

### 3.3 Age

Age is an important variable investigated by this research. As such, chronological, subjective felt age and the observed discrepancy between chronological and subjective age are explored first. Participants were asked for their chronological age and their perceived age.

#### 3.3.1 Chronological Age

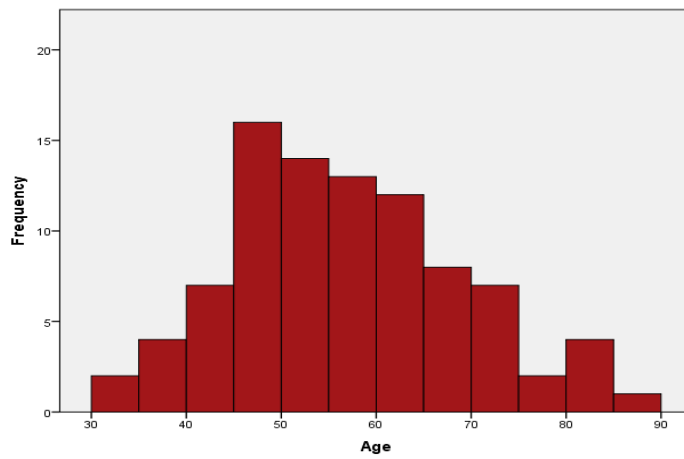
A spread of chronological age was sought for the purposes of this research. Chronological age was significantly normally distributed ( $D(90)$ ,  $0.068$ ,  $p = ns$ ) with a minimum chronological age of 32 years, a maximum of 88 years, and a mean of 56.4 years ( $SD = 12.2$ ). This was explored using a Q-Q plot which is illustrated in Figure 5. The Q-Q plot plots grouped data to examine the overall age spread within the sample, illustrating a relatively normal distribution.



**Figure 5:** Q-Q plot for age to test normal distribution.

Figure 6 illustrates the spread of chronological ages within the sample, and although normally distributed, the greatest distribution of participant ages fell between 47 and 64 years.

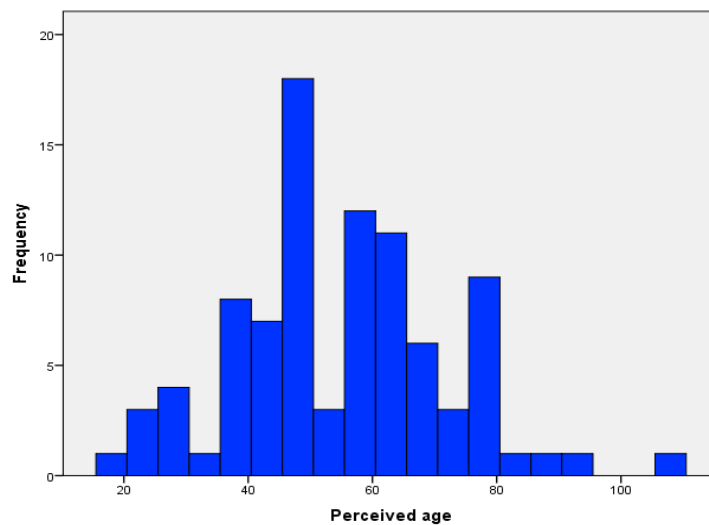




**Figure 6:** Chronological Age Distribution

### 3.3.2 Perceived Age

Participants were asked how old they perceived themselves to be. Perceived age was significantly normally distributed ( $D(90)$ ,  $0.012$ ,  $p = ns$ ) with a minimum perceived age of 18 years, a maximum perceived age of 106, a range of 88 years and a mean perceived age of 56.2 years ( $SD = 17.2$ ). Figure 7 illustrates the spread of perceived age across the sample.



**Figure 7:** Histogram displaying perceived age sample distribution ( $n = 90$ )

### 3.3.3 Age Discrepancy

The discrepancy between chronological and perceived age was significantly non-normally distributed ( $D(90)$ ,  $.20$ ,  $p < 0.05$ ). The mean average discrepancy from chronological age was  $-.04$  years ( $SD = 20.5$  years) with a minimum negative discrepancy of  $-48$  years and a positive maximum discrepancy of 58 years.

### 3.4 Pain Measurement

The following data includes measurements of constructs known to influence pain related distress and adjustment: pain duration and intensity, interference, perceived control, acceptance and catastrophising.

#### 3.4.1 Pain Duration and Diagnosis

Pain duration within the sample varied considerably, ranging from 1 year to 50 years ( $M = 14.12$ ;  $SD = 12.25$ ), but indicated all participants met the criteria for a chronic pain diagnosis (>6 months) and inclusion within the study. Pain duration was significantly non-normally distributed ( $D(90) = 0.18$ ,  $p < .05$ ) and positively skewed suggesting that participants had experienced lengthy pain durations (Mean 14.2 years,  $SD = 1.31$  years).

Participants reported a variety of elapsed time since receiving a diagnosis, ranging from 1 week to 50 years, however, 2 individuals (2.2%) were unsure of their diagnosis. The mean time from interview to receiving a diagnosis was 6.91 years ( $SD = 1.02$ ). This variable was statistically non-normal ( $D(88) = 2.4$ ,  $p < .001$ ) and positively skewed, suggesting more recent diagnoses. Table 4 presents pain severity and interference, acceptance, perceived control and catastrophising data.

**Table 4:** Descriptive pain measurement data (NB: sub-domains are displayed in smaller font)

Measure	Mean	SD	Score Range	N
<b><i>Pain Intensity &amp; Interference (BPI)</i></b>				
Total Pain Severity	5.51	2.10	0-10	90
Worst Pain (24 hours)	6.83	2.46	0-10	90
Least Pain (24 hours)	4.13	2.27	0-10	90
Average Pain	5.52	2.53	0-10	90
Current Pain	5.94	1.87	0-10	90
Total Pain Interference	5.12	2.74	0-10	90
General Activity	5.68	3.04	0-10	90
Mood	5.04	3.03	0-10	90
Walking Ability	5.69	3.09	0-10	90
Normal Work	6.39	2.82	0-10	90
Relationships	3.86	3.15	0-10	90
Sleep	6.36	2.95	0-10	90
Enjoyment of Life	5.70	2.98	0-10	90
<b>Pain Intensity</b>				
VAS	6.34	2.37	0-10cm	90
<b>Pain Acceptance (CPAQ)</b>				
Total Acceptance	64.86	20.56	0-120	90
Activity Engagement	40.51	12.41	0-66	90
Pain Willingness	24.34	11.94	0-54	90
<b>Affective Disturbance (HADS)</b>				
Anxiety	8.34	4.52	0-42	90
Depression	7.37	4.07	0-42	90
<b>Perceived Control (VAS)</b>				
Locus of Control	4.58	2.80	0-10 cm	90
<b>Catastrophising (PCS)</b>				
Total Catastrophising	21.72	12.05	0-52	90

Rumination	7.32	4.16	0-16	90
Magnification	4.50	3.04	0-12	90
Helplessness	9.08	5.89	0-24	90

### 3.4.2 Pain Intensity and Severity

Pain intensity was measured using *The BPI* (Cleeland & Ryan, 1994) and a visual analogue scale (VAS).

*The BPI* produces an overall Pain Severity Score (the Mean of the 4 domains of pain intensity: Worst, least, Average and Current). Total pain severity was normally distributed (D (90), 0.62,  $p = ns$ ) indicating an overall spread of pain intensity and severity. This is not surprising given the variety of pain sites reported by participants, variable pain durations and variable independent and co-morbid diagnoses.

However, when exploring this further using the pain intensity VAS (0-100mm with anchor points from no pain to worst pain) which asked participants to describe their pain over the last 7 days, where higher scores indicate greater pain intensity, this was significantly non-normally distributed (D (90), .13,  $p < .001$ ) and negatively skewed indicating that participants tended to report more severe pain during the 7 days prior to the research interview. *The BPI* assesses pain over the last 24 hours (i.e., least and most), current pain (i.e., at the time of the interview) and usual pain intensity, with higher scores indicative of greater pain intensity. Worst (D (90), 2.2,  $p < .001$ ), average (D (90), 1.5,  $p < .001$ ), and current pain (D (90) = 1.4,  $p < .001$ ) were significantly non-normally distributed, and negatively skewed indicating greater pain intensity overall. However, least pain, also non-normally distributed (D (90), 1.3,  $p < .001$ ), was positively skewed indicating that participants also experience variable pain experiences consonant with chronic pain conditions (e.g., OA).

### 3.4.3 Pain Relief

*The BPI* measures participant pain relief (over the previous 24 hours) ascertained from medication ranging from 0% to 100% relief. Participants reported variable pain medication efficacy, although data suggests on average a lack of perceived efficacy (Mean = 39.77, SD = 26.30, range = 0-100% relief).

### 3.4.4 Pain Interference

*The BPI* also measures pain interference over a variety of domains over the last 24 hours using a standard 0-10 Likert scale (anchor points: 0 = Does not interfere versus 10 = completely interferes). Participants indicated variable levels of interference per domain, however the greatest interference observed was in sleep and work and the least interference was observed with relationships.

*The BPI* also produces a total interference score (the mean of the 7 areas of pain interference). Total interference was normally distributed (D (90), .07,  $p = ns$ ) suggesting variance and a spread within the sample with regards to how interfering pain was perceived.

#### 3.4.5 Pain Acceptance

*The CPAQ* (McCracken, Vowles & Eccleston, 2004) measures total pain acceptance over 2 subscales (i.e., activity engagement and pain willingness), with higher scores indicative of greater pain acceptance. Activity engagement was significantly non-normally distributed (D (90), .11,  $p < .001$ ) and negatively skewed suggesting a greater proportion of participants reporting greater activity engagement in spite of pain. Pain willingness (D (90), .09,  $p = ns$ ) and total acceptance scores were normally distributed (D (90), .09,  $p = ns$ ), indicating a spread of how much participants were willing to experience pain and how accepting of pain they were.

#### 3.4.6 Pain Catastrophising

*The PCS* (Sullivan, Bishop & Pivik, 1995) measures pain catastrophising over 3 domains: rumination, magnification and helplessness, with higher scores indicating heightened difficulties. Total catastrophising was significantly non-normally distributed (D (90), .10,  $p < .05$ ) and positively skewed indicating the sample evidencing less catastrophising. Magnification (D (90), .178,  $p < .001$ ) and helplessness (D (90), .127,  $p < .001$ ) were significantly non-normally distributed and positively skewed suggesting a tendency within the sample to evidence lower magnification and helplessness. However, rumination was normally distributed (D (90), 0.78,  $p = ns$ ), suggesting a greater spread in terms of how much participants ruminate about their pain.

#### 3.4.7 Affect Disturbance

Participant affect was measured using *The HADS* (Zigmond & Snaith, 1983), which is a global measure of distress and anxiety and depression. The mean anxiety score ( $M = 8.34$ ,  $SD = 4.52$ ) was in the clinical borderline case range and the mean depression score ( $M = 7.37$ ,  $SD = 4.07$ ) for the sample was within the non-case range as proposed by Zigmond and Snaith (1983). The total HADS distress score for the sample was 15.73 ( $SD = 7.71$ ), which was calculated by combining both the depression and anxiety scores. The total HADS distress score (D (90), .094,  $p = .05$ ) and the HADS anxiety variable (D (90), .11,  $p = .05$ ) were significantly non-normal, and positively skewed, indicating a clustering of low borderline case anxiety scores. However, the HADS depression variable (D (90), .074,  $p = ns$ ) was normally distributed, illustrating variable affective distress within the sample.

### 3.4.8 Perceived Control

Perceived control was measured using a standardized 10cm visual analogue scale (anchor points = no control and complete control). Participants were asked to indicate on the continuum their perceived sense of pain control, with higher scores indicative of greater perceived control. The mean average for perceived control was 4.58 (SD = 2.80). Data for VAS perceived control was significantly non-normal (D (90), .12,  $p > .05$ ) and positively skewed indicating a greater clustering of participants perceiving greater pain control.

### 3.4.9 Correlation Data

In order to explore the validity of the sample and the data collected observed correlations (Table 5) between variables are compared to existing pain research.

**Table 5:** Correlation data for pain perception and affective distress

	Severity	Interference	PCS	CPAQ	Perceived Control
<b>HADS Total</b>	.320 <sup>τ**</sup>	.408 <sup>τ**</sup>	.541 <sup>τ**</sup>	-.481 <sup>τ**</sup>	-.268 <sup>τ**</sup>
<b>Severity</b>		.798 <sup>r**</sup>	.406 <sup>τ**</sup>	-.461 <sup>r**</sup>	-.200 <sup>τ**</sup>
<b>Interference</b>			.561 <sup>τ**</sup>	-.679 <sup>r**</sup>	.331 <sup>τ**</sup>
<b>PCS</b>				-.524 <sup>τ**</sup>	-.356 <sup>τ**</sup>
<b>CPAQ</b>					.334 <sup>τ**</sup>

τ = Kendall's Tau

r = Pearson's Correlation

\* = Correlation is significance at 0.05 level

\*\* = Correlation is significance at 0.01 level

As anticipated, a variety of correlations between variables investigated within this research indicate that the data is consistent with existing research. For instance, the literature suggests greater affective disturbance with greater levels of catastrophising, lesser acceptance, greater pain severity and interference and lower perceived control (e.g., Richardson, Ong & Sim, 2010; Ellis & D'eon, 2002; McCracken & Samuel, 2007; Vlaeyen *et al.*, 1995; Jordan *et al.*, 1998; Toomey *et al.*, 1991) which were also evidenced by this research.

## 3.5 Identity Measurement

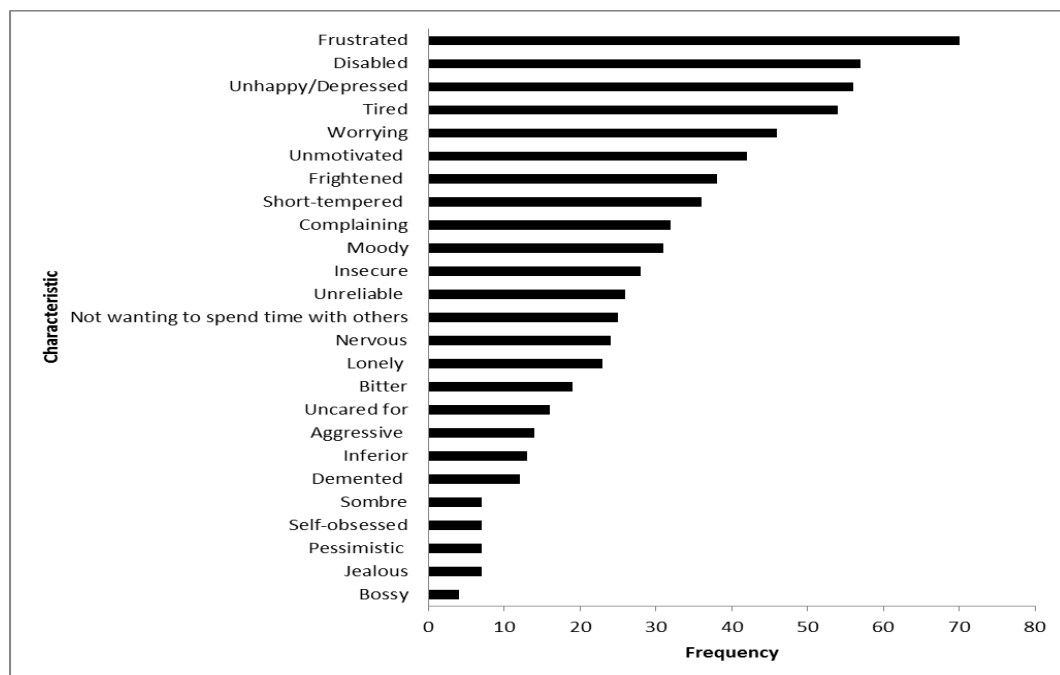
This section presents descriptive data for the identity measures used within this study: Centrality and feared-for and hoped-for selves and sub-domains generated from *The Feared-for and Hoped-for Selves Interviews* and *The CES* (Table 6).

**Table 6:** Identity Measurement descriptive data

Measure	Mean	SD	Score Range	n
<b><i>Feared- For Self</i></b>				
Enmeshment	.23	.30	0-1 (1 = high enmeshment)	90
Proximity	3.98	1.36	1-7 (1 = total proximity)	90
Self-Efficacy	4.24	1.76	1-7 (7 = total efficacy)	90
Expectancy	4.67	1.72	1-7 (7 = high likelihood)	90
Total Items	7.87	2.09	0-10	90
<b><i>Hoped-for Self</i></b>				
Enmeshment	.32	.32	0-1 (1 = high enmeshment)	90
Proximity	3.12	1.39	1-7 (1 = total proximity)	90
Self-Efficacy	4.97	1.55	1-7 (7 = total efficacy)	90
Expectancy	5.06	1.58	1-7 (7 = high likelihood)	90
Total Items	9.04	1.45	0-10	90
<b><i>Centrality of Event</i></b>				
Centrality	70.78	21.81	20-100 (100 = high centrality)	90

### 3.5.1 The Feared-for Self

*The Feared-for Selves Interview* required participants to select 10 feared-for characteristics from a set of 25 that are known to be feared in chronic pain populations (Hooker & Kaus, 1994; Morley, Davies & Barton, 2005; Wells, 2010). Participants were also able to self-generate characteristics if they required, although no participants chose to do this. The mean number of feared-for characteristics chosen by the sample was 7.87 (SD = 2.09). Figure 8 illustrates the frequency of feared-for characteristics chosen by the sample, indicating the greater fears of frustration, low mood and disability.

**Figure 8:** Frequency of feared-for characteristics chosen (n=90)

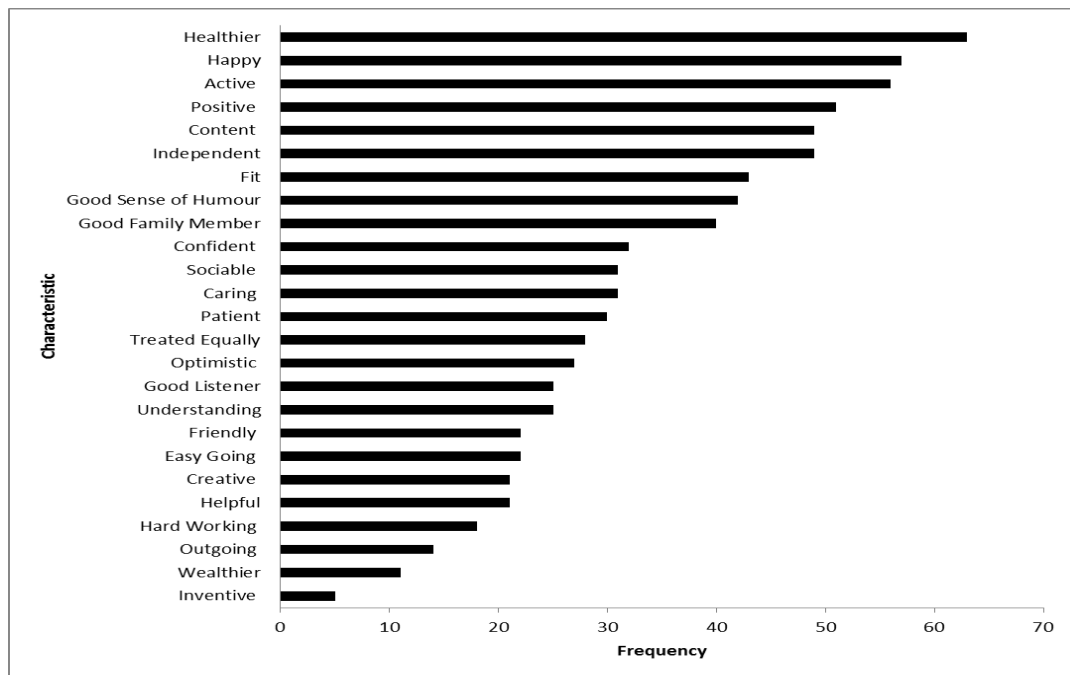
The total number of feared-for characteristics selected was significantly non-normally distributed (D (90), .19,  $p < .05$ ) and negatively skewed, meaning that

participants generally chose a relatively large number of feared characteristics. Feared-for proximity, how close individuals feel to what they fear, was normally distributed ( $D(90)$ ,  $.077$ ,  $p = ns$ ). Feared-for expectancy, the extent to which participants perceived the likelihood of their feared-for characteristics coming true was also significantly non-normally distributed ( $D(90)$ ,  $.18$ ,  $p < .05$ ) and negatively skewed indicating that on average participants expected their feared characteristics to occur in the future. Feared-for efficacy, the perception of being able to prevent feared-for characteristics coming true in the future, was significantly non-normally distributed ( $D(90)$ ,  $.17$ ,  $p < .05$ ) and negatively skewed indicating the perception of participants feeling unable to prevent their feared characteristics from coming true. Feared-for enmeshment, how conditional each feared-for characteristics is with continued pain, was also significantly non-normally distributed ( $D(90)$ ,  $.26$ ,  $p < .05$ ) and was positively skewed indicating that individuals were un-enmeshed perceiving feared characteristics to be possible without pain (i.e., lack of conditionality).

From this it appears that participants, on average, indicated a lack of feared-for enmeshment, meaning that they perceived what they feared to be possible without pain (i.e., lack of conditionality). However, they also demonstrated proximity to their feared characteristics and a limited capability (i.e., self-efficacy) to prevent these from coming true in the future and a perception that they were likely to occur.

### 3.5.2 *The Hoped-for Self*

*The Hoped-for Selves Interview* required participants to select 10 hoped-for characteristics from a set of 25 that are known to be hoped-for in chronic pain populations (Hooker & Kaus, 1994; Morley, Davies & Barton., 2005; Wells, 2010). Participants were also able to self-generate characteristics if they required, although no participants chose to do this. The mean number of hoped-for characteristics chosen by the sample was 9.04 ( $SD = 1.45$ ). Figure 9 illustrates the frequency of hoped-for self characteristics chosen by the sample, indicating the greatest hopes included feeling healthier, happy and being active.



**Figure 9:** Frequency of hoped-for self-characteristics chosen (n=90)

The number of hoped-for characteristics was significantly non-normal ( $D(90), .32, p < .05$ ) and negatively skewed, meaning that individuals tended to choose a large number of characteristics they hoped for. Hoped-for proximity, how close an individual feels to their hoped-for characteristics was also non-normally distributed ( $D(90), .09, p < .05$ ) and positively skewed, indicating a perceived current closeness to what they hope for. Hoped-for expectancy, the extent to which participants perceived the likelihood of hoped-for characteristics coming true in the future, was also non-normally distributed ( $D(90), .23, p < .05$ ) and negatively skewed suggesting that the majority of participants perceived that their hoped-for characteristics were likely to occur in the future. Hoped-for self-efficacy scores, the extent to which participants felt capable of attaining their hoped-for characteristics, was also significantly non-normally distributed ( $D(90), .20, p < .05$ ) and negatively skewed suggesting that participants tended to feel capable of making their hoped-for characteristics occur in the future.

Hoped-for enmeshment, indicating the extent to which hoped-for selves are conditional upon pain continuation, was significantly non-normally distributed ( $D(90), .18, p < .05$ ) and positively skewed indicating that individuals were un-enmeshed perceiving hoped-for characteristics to be possible without pain (i.e., lack of conditionality).

Participants, on average, demonstrated a lack of hoped-for self enmeshment, meaning that they perceived what they hope to be in the future to be possible in spite of pain (i.e., lack of conditionality). They also demonstrated proximity to what they hope to be in the future, and some sense of expectancy that what they hope to be will occur and of being able to achieve these.



### 3.5.3 Centrality

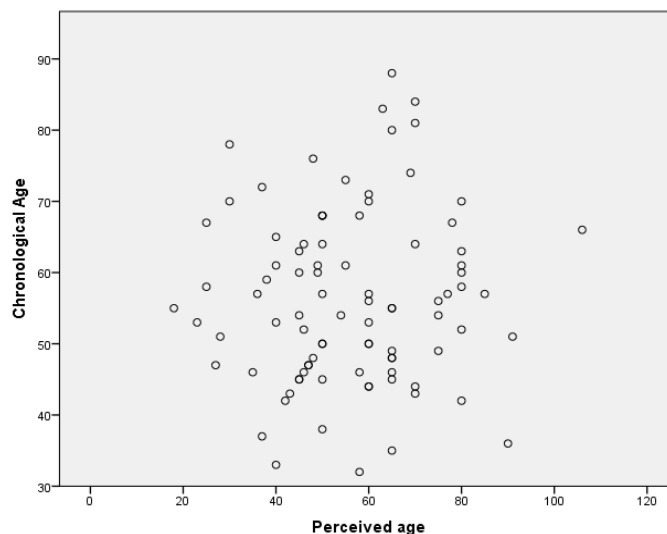
*The CES* (Berntsen & Rubin, 2006) measured the extent to which an individual integrates a target trauma into their identity – in this case chronic pain. *The CES* consists of 20 items measuring whether a trauma associated memory (i.e., pain) becomes a reference point for everyday inferences, has become a turning point in a person's life and whether this trauma has become a central part of someone's identity. A total centrality score reflects the average of all 20 items, with higher centrality scores indicative of more enhanced autobiographical integration of a target trauma (score range = 20 - 100). Data for *The CES* was significantly non-normal ( $D(90), .17, p < .01$ ), demonstrating a negative skew and indicating that, on average, this sample has integrated pain as an autobiographical memory and thus become part of their identity. Mean centrality scores were also comparable to that of Perri and Keefe (2008).

## 3.6 The relationship between 'Chronological Age' and 'Perceived Age'

Prior to assessing potential relationships between age and identity in the context of chronic pain, the relationships between the measurements of age and age perception are investigated first to identify the usefulness of chronological age as a predictive variable in the context of chronic pain and to explain identity enmeshment, centrality and adjustment.

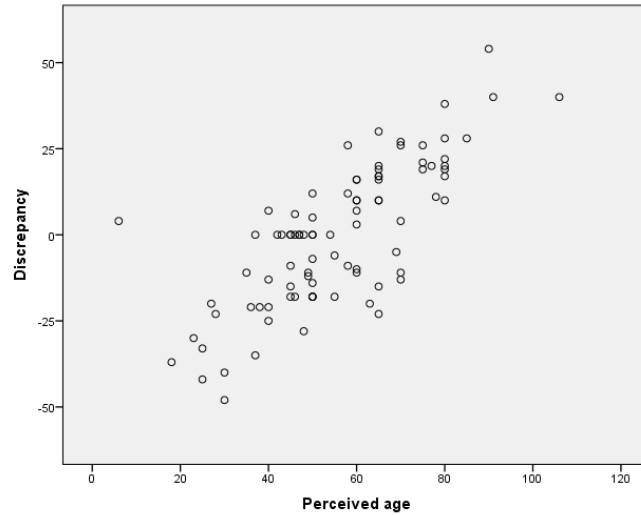
### 3.6.1 Age Perception

No relationship was observed between chronological age and perceived age as displayed by Figure 10. This suggests that in the context of chronic pain older adults do not appear to feel consistently younger, nor do younger adults consistently perceive themselves to be older.



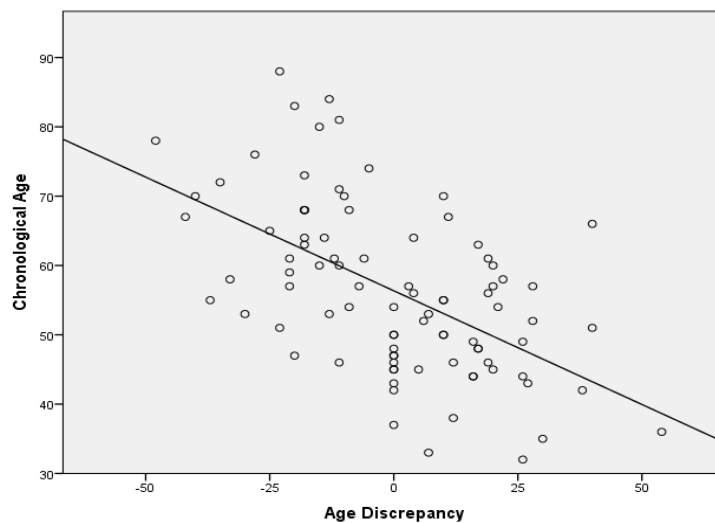
**Figure 10:** Scatterplot of chronological and perceived age illustrating no relationship.

Figure 11 plots perceived age and the discrepancy between chronological and perceived age, and suggests greater positive discrepancies with greater perceived ages (i.e., feeling older than one's actual age) and greater negative discrepancies with lower perceived ages (i.e., feeling younger than one's actual age). Perceived age demonstrated a strong significant relationship with age discrepancy ( $\tau = .600, p < .001$ ).



**Figure 11:** Scatterplot of perceived age against discrepancy demonstrating a positive relationship trend

The difference, both positive and negative, between participant's chronological and perceived age was calculated using subtraction. Figure 12 illustrates a plot of chronological age and discrepancy. This data illustrates a trend towards increased positive discrepancies (i.e., feeling older than one actually is) for younger adults with chronic pain, and a negative discrepancy (i.e., feeling younger than their actual age) for older adults with chronic pain. Chronological age demonstrated a significant correlation with age discrepancy ( $\tau = -.380, p < 0.001$ ).



**Figure 12:** Scatterplot of chronological age and age discrepancy demonstrating a negative relationship trend.

In summary, this data suggests the importance of perceived age and age discrepancy in the context of chronic pain rather than chronological age per se which has been employed by previous research.

### 3.7 Age and The Self (Centrality, Enmeshment and Proximity)

To investigate and identify potential significant relationships between age and measures of enmeshment and proximity to what participants fear and hope-for in the future, and how centralised pain has become to identity, the following correlations were performed (Table 7):

**Table 7:** Correlation data between age measures and identity

Age Category	Centrality	F-F Proximity	F-F Enmeshment	H-F Proximity	H-F Enmeshment
Chronological Age	-.001	.034	.028	-.172 $\tau^*$	-.044
Perceived Age	.229 $\tau^{**}$	-.300 $\tau^{**}$	.131	.259 $\tau^{**}$	.139
Age Discrepancy	.187 $\tau^*$	-.169 $\tau^*$	.079	.349 $\tau^{**}$	.146

$\tau$  = Kendall's Tau

r = Pearson's Correlation Coefficient

\* = Correlation is significance at 0.05 level

\*\* = Correlation is significance at 0.01 level

Chronological and perceived age and age discrepancy did not correlate with measures of enmeshment, which suggests that how conditional hoped-for and feared-for selves are upon pain, have limited relationships with chronological age. However, perceived age and age discrepancy demonstrated positive relationships with centrality suggesting that increased perceived age (feeling older) is associated with pain becoming a central part and turning point in someone's life, and a reference point for other less salient experiences.

Chronological age evidenced a significant negative correlation with hoped-for self proximity suggesting a greater closeness to hoped-for selves with advancing age. Significant correlations were also observed between increased perceived age and closer proximity to feared-for selves. A significant relationship was observed between increased perceived age and hoped-for proximity, suggesting a greater remoteness from hoped-for selves with greater perceived age (feeling older).

Age discrepancy (the difference between chronological and perceived age) also evidenced a significant correlation with hoped-for proximity, suggesting that with increasing positive age discrepancy (i.e., feeling older than one's actual age) there is a greater remoteness from what is hoped-for and a greater sense of pain becoming integrated into one's sense of self, and conversely, with a negative age discrepancy (i.e., feeling younger than one actually is), there is a closer proximity to what is hoped-for and reduced pain integration into the self. Interestingly age discrepancy evidenced a

significant negative correlation with feared-for proximity, suggesting that with positive age disparity (i.e., feeling older than one actually is) the greater the perceived closeness to what is feared and that with negative age disparity (feeling younger) the greater the perceived remoteness from what is feared-for in the future.

### 3.8 Age, Self-Efficacy and Perceived Expectancy

A further adjunct to the self discrepancy feared-for and hoped-for models include whether participants feel able to prevent feared-for selves and to achieve hoped-for selves in the future, and how likely both these are to occur. Table 8 displays the observed correlation data for these sub-domains of the feared-for and hoped-for self-discrepancy models.

**Table 8:** Correlation data between age measures and hoped-for and feared-for expectancy and self-efficacy.

Age Category	Feared-for Expectancy	Feared-for Self-Efficacy	Hoped-for Expectancy	Hoped-for Self-Efficacy
<b>Chronological Age</b>	-.055	.065	-.016	.058
<b>Perceived Age</b>	.145	-.272 $\tau^{**}$	-.230 $\tau^{**}$	-.183 $\tau^*$
<b>Age Discrepancy</b>	.159 $\tau^*$	-.253 $\tau^{**}$	-.212 $\tau^{**}$	-.197 $\tau^*$

$\tau$  = Kendall's Tau

r = Pearson's Correlation Coefficient

\* = Correlation is significance at 0.05 level

\*\* = Correlation is significance at 0.01 level

Chronological age did not demonstrate any significant relationships between participant's perceived capability of preventing their feared-for selves from occurring in the future and their expectation that what they feared for the future would come true. This lack of relationship with chronological age was also repeated for hoped-for expectancy and self-efficacy.

Perceived age demonstrated negative significant correlations with feared-for self-efficacy, hoped-for expectancy and self-efficacy. These findings suggest that with a greater perceived age, individuals feel less capable of preventing what they fear from coming true in the future, less capable of achieving what they hope-for, and perceive their hoped-for selves as unlikely to occur in the future.

Age discrepancy also indicated a significant positive correlation with feared-for expectancy scores, and a negative significant correlation with feared-for self-efficacy, hoped-for expectancy and self-efficacy. These findings suggest that with greater positive age discrepancies (i.e., feeling older than one's actual age) are associated with a greater perceived likelihood that what is feared will come true in the future, and a reduced perceived capability of preventing feared-selves from occurring. Regarding hoped-for self-efficacy and expectancy, findings indicate that feeling older is associated with the

perception that hoped-for selves are unlikely to occur in the future, and perceived incapability of achieving these in the future.

### 3.9 The inter-relationship between Centrality, Enmeshment and Proximity

To explore the relationship between centrality and feared-for and hoped-for identity enmeshment and proximity, initial correlations were explored (Table 9).

**Table 9:** Correlation data between centrality and hoped-for and feared-for enmeshment and proximity.

	<b>Feared-for Proximity</b>	<b>Feared-for Enmeshment</b>	<b>Hoped-for Proximity</b>	<b>Hoped-for Enmeshment</b>
<b>Centrality</b>	-.427 <sup>τ**</sup>	.200 <sup>τ**</sup>	.401 <sup>τ**</sup>	.239 <sup>τ**</sup>

τ = Kendall's Tau

r = Pearson's Correlation

\* = Correlation is significance at 0.05 level

\*\* = Correlation is significance at 0.01 level

Centrality demonstrated positive significant relationships with feared-for and hoped-for enmeshment and hoped-for proximity, and a negative significant relationship with feared-for proximity.

These relationships indicate that with greater centrality, individuals experience a greater enmeshment to what they fear and hope for, a greater proximity to what they fear and a greater remoteness to what they hope for, for the future, and the potential inter-relatedness of these measures. However, this relationship may not be causal, but recursive.

Despite these significant correlations, the positive skew of the feared-for and hoped-for enmeshment data restricts potential statistical analysis especially when comparing their functionality with that of *The CES*. To address this, feared-for and hoped-for enmeshment data were transformed to isolate groups of individuals evidencing no enmeshment, low enmeshment and high enmeshment, in order to explore these groups with predictor variables (e.g., age) and other pain-identity measures (e.g., centrality). Feared-for and hoped-for enmeshment data were explored using stem and leaf modelling to adequately divide feared-for enmeshment data into equal groups, specifically those evidencing high enmeshment (>0.5-1.0), low enmeshment (0.1>0.499), and no enmeshment (0). Table 10 illustrates the relative equal distribution of participants between these enmeshment categories.

Cross-tabulation was performed to explore the relationship between hoped-for and feared-for enmeshment categories. Expected values were greater than 5 as per Chi-Square test recommendations with data not violating test assumptions (e.g., no reliance on normal distribution). This procedure generates information about bivariate relationships. Table 10 displays frequency data for hoped-for and feared-for enmeshment.

**Table 10:** Feared-for and hoped-for enmeshment cross-tabulation

		Hoped-for Enmeshment Category			Total
		Not Enmeshed	Low Enmeshment	High Enmeshment	
Feared-for Enmeshment Category	<b>Not Enmeshed</b>	16	14	6	36
	% within F-F Enmeshment Cat	44.4	38.9	16.7	
	% within H-F Enmeshment Cat	53.3	43.8	21.4	
	<b>Low Enmeshment</b>	11	15	9	35
	% within F-F Enmeshment Cat	31.4	42.9	25.7	
	% within H-F Enmeshment Cat	36.7	46.9	32.1	
	<b>High Enmeshment</b>	3	3	13	19
	% within F-F Enmeshment Cat	15.8	15.8	68.4	
	% within H-F Enmeshment Cat	3.3	9.4	46.4	
	Total	30	32	28	90

Table 10 illustrates the relationships between the hoped-for and feared-for enmeshment categories. This data suggests a greater proportion of individuals who evidence no hoped-for enmeshment also evidence no or low feared-for enmeshment. Conversely, a greater proportion of individuals evidencing high feared-for enmeshment also evidence high hoped-for enmeshment, suggesting that these positions are related, with trends indicating parallel levels of enmeshment (none, low and high) between hoped-for and feared-for categories. The largest proportions observed are those evidencing low feared-for and hoped-for enmeshment and those with high feared-for and hoped-for enmeshment, which would be expected as per previous research (e.g., Morley, Davies & Barton, 2005).

The Pearson's Chi Square statistic ( $X^2$ ,  $df = 2$ ) was 17.094 ( $p < 0.05$ ) suggesting that no, low and high hoped-for and feared-for enmeshment are not independent but related. Furthermore, to explore the strength of this relationship the Contingency Coefficient was calculated, generating a value between 0 and 1. For this data the Contingency Coefficient value was 0.400 ( $p < 0.05$ ) out of a possible maximum value of 1 representing a medium association between the hoped-for and feared-for categories.

To further explore the relationship between enmeshment and centrality, a between groups analysis of variance (ANOVA) was used to determine if any significant differences existed between centrality and hoped-for and feared-for enmeshment, and to determine the location of any statistically significant differences. Centrality and feared-for enmeshment is explored first, followed by hoped-for enmeshment.

### 3.9.1 Centrality and Feared-for Enmeshment

**Table 11:** Descriptive data for centrality and feared-for Enmeshment.

	N	Mean	SD	Std. Error	95% CI - Lower Bound	95% CI - Upper Bound	Min	Max
<b>Not Enmeshed</b>	36	63.83	22.24	3.87	55.97	71.69	24	100
<b>Low Enmeshment</b>	35	73.51	19.12	3.23	66.95	80.08	32	99
<b>High Enmeshment</b>	19	78.89	20.77	7.77	68.88	88.91	22	100
<b>Total</b>	90	70.78	21.81	2.30	66.21	75.35	22	100

Table 11 illustrates the differing centrality mean scores for the feared-for enmeshment categories, where increased centrality is observed for increased feared-for enmeshment. Furthermore, the minimum and maximum scores also indicate much overlap between the measures, suggesting variance between high enmeshment and low centrality and vice versa. In order to robustly employ ANOVA, homogeneity of variance required exploration to identify if data violated this assumption. The Levene Statistic for feared-for enmeshment and centrality data was 1.042 ( $p > .05$ ) indicating non violation of the assumption of homogeneity of variance. To explore the relationship between centrality and feared-for enmeshment a one-way between groups ANOVA was performed to determine if observed differences were statistically significant between categories (Table 12).

**Table 12:** ANOVA for centrality and feared-for enmeshment category data

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean<sup>2</sup></b>	<b>F</b>	<b>Sig.</b>
<b>Between Groups</b>	3250.02	2	1625.01	3.61	.031
<b>Within Groups</b>	39087.53	87	449.28		
<b>Total</b>	42337.55	89			

A significant difference was observed between groups ( $F = 3.617$ ,  $p < .05$ ) in relation to centrality and the feared-for enmeshment categories. To determine the importance of this finding the effect size ( $\text{Eta}^2$ ) was calculated using the following equation:

$$\text{Eta Squared} = \frac{\text{Sum of square between-groups}}{\text{Total Sum of Squares}}$$

The effect size ( $\text{Eta} = 0.07$ ) as per Cohen's (1988) terms would be considered a small effect size. To further explore and identify the location of this statistically significant difference, post-hoc analyses using the Bonferoni corrections for multiple comparisons was performed (Table 13).

**Table 13:** Post hoc analysis – multiple comparisons for centrality and feared-for enmeshment categories

<b>Feared-for Enmeshment Category</b>	<b>Feared-for Enmeshment Category</b>	<b>Mean Diff'</b>	<b>Std. Error</b>	<b>Sig</b>	<b>95% CI Lower Bound</b>	<b>95% CI Upper Bound</b>
<b>Not Enmeshed</b>	Low Enmeshment	-9.681	5.032	.173	-21.96	2.60
	High Enmeshment	-15.061*	6.011	.042	-29.73	-.39
<b>Low Enmeshment</b>	Not Enmeshed	9.681	5.032	.173	-2.60	21.96
	High Enmeshment	-5.380	6.040	1.00	-20.13	9.36
<b>High Enmeshment</b>	Not Enmeshed	15.061*	6.011	.042	.39	29.73
	Low Enmeshment	5.380	6.040	1.00	-9.36	20.13

\* The mean difference is significant at the 0.05 level

Post-hoc comparisons indicated that the centrality mean score for no feared-for enmeshment ( $M = 63.83$ ,  $SD = 23.24$ ) was significantly different from the centrality mean score high feared-for enmeshment ( $M = 78.89$ ,  $SD = 20.77$ ). Mean centrality scores for the low feared-for enmeshment category ( $M = 73.51$ ,  $SD = 19.12$ ) did not differ significantly from the no or high hoped-for enmeshment categories. This suggests a significant relationship between centrality and feared-for enmeshment measures, specifically for participants whose feared-for selves were enmeshed and conditional with the permanence of pain and those whose identity was not. Furthermore, this also suggests that individuals with high feared-for enmeshment demonstrate significantly higher levels of centrality, and those with no feared-for enmeshment evidence significantly lower levels of centrality.

### 3.9.2 Centrality and Hoped-for Enmeshment

**Table 14:** Descriptive data for centrality and hoped-for enmeshment.

	N	Mean	SD	Std. Error	95% CI - Lower Bound	95% CI - Upper Bound	Min	Max
<b>Not Enmeshed</b>	30	62.23	22.77	4.16	53.73	70.74	24	93
<b>Low Enmeshment</b>	32	70.75	19.73	3.49	63.67	77.86	34	100
<b>High Enmeshment</b>	28	79.96	19.88	3.76	72.25	87.67	22	100
<b>Total</b>	90	70.73	21.81	2.30	66.21	75.35	22	100

Table 14 illustrates the differing mean scores hoped-for enmeshment categories, where increased scores of centrality are observed for increasing categories of hoped-for enmeshment. Furthermore, the minimum and maximum scores also indicate much overlap between the measures, suggesting variance between high enmeshment and low centrality and vice versa. In order to robustly employ ANOVA homogeneity of variance required exploration to identify if data violated this assumption. The Levene Statistic for hoped-for enmeshment and centrality data was .779 ( $p > .05$ ) indicating non violation of the assumption of homogeneity of variance. To explore the relationship between centrality and feared-for enmeshment further a one-way between groups ANOVA was performed to determine if observed differences were statistically significant between these categories. To explore this further a one-way ANOVA was performed to determine if such observed differences were statistically significant between these categories (Table 15).

**Table 15:** ANOVA for centrality and hoped-for enmeshment category data

	Sum of Squares	Df	Mean <sup>2</sup>	F	Sig.
<b>Between Groups</b>	455.23	2	2276.61	5.24	.007
<b>Within Groups</b>	377484.33	87	434.30		
<b>Total</b>	42337.56	89			



A significant difference was observed between groups ( $F = 3.617, p < 0.05$ ) in relation to centrality and the hoped-for enmeshment categories. To determine the importance of this finding the effect size ( $\eta^2$ ) was calculated using the following equation:

$$\text{Eta Squared} = \frac{\text{Sum of square between-groups}}{\text{Total Sum of Squares}}$$

The effect size ( $\eta = 0.11$ ) as per Cohen's (1988) terms would be considered a small effect size. To further explore and identify the location of this statistically significant difference, post-hoc analyses using the Bonferoni corrections for multiple comparisons was performed (Table 16).

**Table 16:** Post hoc analysis – Multiple comparisons for centrality and hoped-for enmeshment categories

Hoped-for Enmeshment Category	Hoped-for Enmeshment Category	Mean Diff <sup>a</sup>	Std. Error	Sig.	95% CI Lower Bound	95% CI Upper Bound
<b>Not Enmeshed</b>	Low Enmeshment	- 8.517	5.296	.334	- 21.45	4.41
	High Enmeshment	- 17.731*	5.476	.005	- 31.10	- 4.36
<b>Low Enmeshment</b>	Not Enmeshed	8.517	5.296	.334	- 4.41	21.45
	High Enmeshment	- 9.214	5.393	.273	- 22.38	3.95
<b>High Enmeshment</b>	Not Enmeshed	17.731*	5.476	.005	4.36	31.10
	Low Enmeshment	9.214	5.393	.273	- 3.95	22.38

\* The mean difference is significant at the 0.05 level.

Table 16 illustrates the location of the observed statistical difference was between participants with high centrality and high hoped-for enmeshment and low centrality and no hoped-for enmeshment. Post-hoc comparisons indicated that the mean score for no hoped-for enmeshment ( $M = 62.23, SD = 22.77$ ) was significantly different from high hoped-for enmeshment ( $M = 79.96, SD = 19.88$ ). Low hoped-for enmeshment ( $M = 70.75, SD = 19.73$ ) did not differ significantly from either no or high hoped-for enmeshment. This suggests a significant relationship between centrality and hoped-for enmeshment measures, specifically for participants whose hoped-for selves were enmeshed and conditional with the permanence of pain and those whose identity was not. Furthermore, this also suggests that individuals with high hoped-for enmeshment demonstrate significantly higher levels of centrality, and those with no hoped-for enmeshment evidence significantly lower levels of centrality. However, despite reaching statistical significance, the actual difference in mean scores between the groups was quite small.

In summary this data indicates that *The CES*, although initially thought to be measuring similar constructs to self-discrepancy (i.e., enmeshment and proximity) is likely to be measuring something different. Although centrality and high and no

enmeshment evidenced significant post-hoc relationships, effect sizes are considerably small, and likely indicate the independence of the measures. What may also be of interest is that greater significant relationships and effect size were observed between centrality and feared-for enmeshment and proximity, and perhaps, this indicates more of a relationship rather than to what is hoped for. It seems that people can become ‘enmeshed’ but this does not necessarily mean that pain has become central to their identity. This is further supported by the minimum and maximum centrality scores for the hoped-for and feared-for enmeshment categories indicating that individuals with and without enmeshment also demonstrate high centrality. This overlap is likely to have impacted upon the observed effect sizes.

### 3.10 Self Discrepancy, Centrality and Adjustment

To explore adjustment in relation to the ‘self’, potential relationships between self-discrepancy models and centrality with pain perception and affective distress were investigated using correlation. Table 17 displays this information.

**Table 17:** Correlation data for identity measures and pain perception and affective disturbance.

	CES	H-F Enmesh- ment	H-F Proximity	F-F Enmesh- ment	F-F Proximity
<b>Severity</b>	.344 $\tau^{**}$	.093	.296 $\tau^{**}$	.231 $\tau^{**}$	-.356 $\tau^{**}$
<b>Interference</b>	.437 $\tau^{**}$	.139	.443 $\tau^{**}$	.224 $\tau^{**}$	-.509 $\tau^{**}$
<b>Perceived Control</b>	-.272 $\tau^{**}$	-.146	-.336 $\tau^{**}$	-.208 $\tau^{**}$	.301 $\tau^{**}$
<b>HADS Total</b>	.401 $\tau^{**}$	.250 $\tau^{**}$	.500 $\tau^{**}$	.124	-.246 $\tau^{**}$
Anxiety	.350 $\tau^{**}$	.238 $\tau^{**}$	.493 $\tau^{**}$	.058	-.235 $\tau^{**}$
Depression	.377 $\tau^{**}$	.219 $\tau^{**}$	.403 $\tau^{**}$	.183 $\tau^{*}$	-.220 $\tau^{**}$
<b>PCS Total</b>	.410 $\tau^{**}$	.238 $\tau^{**}$	.492 $\tau^{**}$	.172 $\tau^{*}$	-.310 $\tau^{**}$
Rumination	.360 $\tau^{**}$	.235 $\tau^{**}$	.479 $\tau^{**}$	.201 $\tau^{*}$	-.299 $\tau^{**}$
Magnification	.323 $\tau^{**}$	.086	.294 $\tau^{**}$	.066	-.236 $\tau^{**}$
Helplessness	.350 $\tau^{**}$	.225 $\tau^{**}$	.427 $\tau^{**}$	.182 $\tau^{*}$	-.211 $\tau^{**}$
<b>CPAQ</b>	-.503 $\tau^{**}$	-.364 $\tau^{**}$	-.503 $\tau^{**}$	-.288 $\tau^{**}$	.361 $\tau^{**}$
Activity Engage	-.343 $\tau^{**}$	-.384 $\tau^{**}$	-.409 $\tau^{**}$	-.190 $\tau^{*}$	.245 $\tau^{**}$
Pain Willingness	-.468 $\tau^{**}$	-.247 $\tau^{**}$	-.451 $\tau^{**}$	-.324 $\tau^{**}$	.326 $\tau^{**}$

$\tau$  = Kendall's Tau

r = Pearson's Correlation Coefficient

\* = Correlation is significance at 0.05 level

\*\* = Correlation is significance at 0.01 level

The above data confirms established relationships (e.g., Perri & Keefe, 2008; Morley, Davies & Barton, 2005, Wells, 2010) between greater affective disturbance and greater pain-identity centrality, and hoped-for and feared-for enmeshment and proximity in relation to depression, anxiety, pain severity, and reduced pain acceptance and perceived control. This data suggests that with enmeshment to what is feared and hoped-for, a remoteness from what is hoped and a proximity to what is feared, and where pain becomes centralised, is associated with increased affective disturbance, increased catastrophising, increased perceived pain severity and interference, reduced control and reduced pain acceptance.

### 3.11 Expectation, Self-Efficacy and Adjustment

To examine the relationship between pain adjustment and the expectation that feared-for and hoped-for characteristics are likely to occur in the future, and the perceived ability to prevent what is feared and achieve what is hoped for, further correlations were performed between pain perception, affective disturbance and pain acceptance with hoped-for and feared-for self-efficacy and expectancy sub-domains of the self-discrepancy model. Table 18 displays this information.

**Table 18:** Correlation data for pain perception and affective distress with self-efficacy and expectancy of Hoped-for and Feared-for selves.

	<b>Feared-for Self- Expectancy</b>	<b>Feared-for Self- Efficacy</b>	<b>Hoped-for Expectancy</b>	<b>Hoped-for Self-Efficacy</b>
<b>Severity</b>	.263 $\tau^{**}$	-.183 $\tau^*$	-.236 $\tau^{**}$	-.143
<b>Interference</b>	.276 $\tau^{**}$	-.182 $\tau^*$	-.302 $\tau^{**}$	-.212 $\tau^{**}$
<b>Perceived Control</b>	-.289 $\tau^{**}$	-.107	.210 $\tau^{**}$	.161 $\tau^*$
<b>HADS Total</b>	.244 $\tau^{**}$	-.253 $\tau^{**}$	-.259 $\tau^{**}$	-.290 $\tau^{**}$
Anxiety	.244 $\tau^{**}$	-.202 $\tau^*$	-.220 $\tau^{**}$	-.229 $\tau^{**}$
Depression	.260 $\tau^{**}$	-.292 $\tau^{**}$	-.257 $\tau^{**}$	-.311 $\tau^{**}$
<b>PCS Total</b>	.257 $\tau^{**}$	-.197 $\tau^*$	-.249 $\tau^{**}$	-.280 $\tau^{**}$
Rumination	.226 $\tau^{**}$	-.249 $\tau^{**}$	-.272 $\tau^{**}$	-.341 $\tau^{**}$
Magnification	.225 $\tau^{**}$	-.182 $\tau^*$	-.204 $\tau^*$	-.231 $\tau^{**}$
Helplessness	.176 $\tau^*$	-.170 $\tau^*$	-.166 $\tau^*$	-.272 $\tau^{**}$
<b>CPAQ</b>	-.310 $\tau^{**}$	.245 $\tau^{**}$	.238 $\tau^{**}$	.273 $\tau^{**}$
Activity Engage	-.237 $\tau^{**}$	.230 $\tau^{**}$	.220 $\tau^{**}$	.292 $\tau^{**}$
Pain Willingness	-.281 $\tau^{**}$	.169 $\tau^*$	.228 $\tau^{**}$	.184 $\tau^*$

$\tau$  = Kendall's Tau

r = Pearson's Correlation Coefficient

\* = Correlation is significance at 0.05 level

\*\* = Correlation is significance at 0.01 level

Correlation data confirms established relationships between greater expectancy and reduced self-efficacy with regards to feared-for characteristics and hoped-for characteristics and affective disturbance and pain acceptance (e.g., Higgins, 1987, Morley & Eccleston, 2004). Only pain severity and hoped-for self-efficacy and perceived control and feared-for self-efficacy did not produce significant relationships.

In summary this data suggests, in the context of chronic pain, the perceived likelihood of what is feared or hoped-for in the future and the perception of being able to achieve or avoid what is hoped or feared has a significant link with pain acceptance and adjustment, affect, catastrophic thinking and interferes with activities of daily living.

### 3.12 Age and Adjustment

To explore potential relationships between age and pain adjustment (i.e., perception, affective distress, acceptance etc.) correlations were performed. Table 19 displays this information.

**Table 19:** Correlation data for age and pain perception and affective disturbance.

	<b>Chronological Age</b>	<b>Perceived Age</b>	<b>Age Discrepancy</b>
<b>Severity</b>	.048	.435 <sup>r**</sup>	.258 <sup>τ**</sup>
<b>Interference</b>	.048	.435 <sup>r**</sup>	.297 <sup>τ**</sup>
<b>Perceived Control</b>	-.019	-.142	-.127
<b>HADS Total</b>	-.173 <sup>τ*</sup>	.218 <sup>τ**</sup>	.325 <sup>τ**</sup>
Anxiety	-.206 <sup>τ**</sup>	.196 <sup>τ**</sup>	.325 <sup>τ**</sup>
Depression	-.192	.336 <sup>r**</sup>	.289 <sup>τ**</sup>
<b>PCS Total</b>	-.056	.252 <sup>τ**</sup>	.290 <sup>τ**</sup>
Rumination	-.039	.315 <sup>r**</sup>	.224 <sup>τ**</sup>
Magnification	-.108	.088	.181 <sup>τ**</sup>
Helplessness	-.051	.252 <sup>τ**</sup>	.254 <sup>τ**</sup>
<b>CPAQ</b>	.096	-.361 <sup>r**</sup>	-.278 <sup>τ**</sup>
Activity Engagement	.091	-.221 <sup>τ**</sup>	-.237 <sup>τ**</sup>
Pain Willingness	.077	-.310 <sup>r**</sup>	-.252 <sup>τ**</sup>

τ = Kendall's Tau

\* = Correlation is significance at 0.05 level

r = Pearson's Correlation Coefficient \*\* = Correlation is significance at 0.01 level

Chronological age evidenced few significant relationships with measures of adjustment. Chronological age did evidence a significant negative correlation with anxiety, suggesting reduced anxiety with advancing age.

Perceived age significantly and positively correlated with pain severity, pain intensity, pain interference, affective disturbance, rumination and perceived helplessness which suggests an association between feeling older and experiencing more severe, intense, interfering and distressing pain. With regards to acceptance, negative significant correlations were observed with perceived age indicating an association between greater perceived age and feeling less accepting of pain, reduced activity engagement and an unwillingness to experience pain.

Age discrepancy also correlated significantly with pain severity, intensity, interference, affective disturbance, and catastrophising measures, mirroring correlations observed with perceived age. This suggests an association between greater positive age discrepancies (feeling older) and experiencing greater pain related distress, more severe and intense pain, and greater catastrophic thinking and rumination. Furthermore, negative significant correlations were also observed with acceptance measures, again mirroring perceived age, and suggesting an association between greater positive age discrepancies, and less acceptance and willingness to have pain and engage in activity.

In summary, perceived age and age discrepancy evidenced more significant relationships than chronological age with variables assessing affective distress and pain adjustment.

### 3.12.1 Multiple Regression Analyses

Correlation data suggested variables were worthy of additional statistical investigation, specifically with regards to the impact of perceived age, centrality,

enmeshment and proximity and chronic pain adjustment (as measured by affective disturbance).

### *3.12.2 Selecting predictor variables*

Tabachnik & Fidell (2007) recommend the selection of the fewest predictor variables (independent variables), with each being substantially predictive and providing an independent portion of the outcome (dependent variable). Affective distress was chosen as the dependent variable. The literature notes that affective distress is the greatest indicator of pain adjustment (Keefe *et al.*, 2004), which provides a rationale for using this for predictive analytic purposes. The correlations reported by this research, a review of the pain-adjustment literature and the primary aims of this research established which variables not only significantly correlated with affective distress but also those that warranted further investigation. Dependent variables investigated included: perceived age, pain severity, hoped-for and feared-for enmeshment and proximity and centrality.

Although centrality and feared-for and hoped-for enmeshment positively correlated within the sample data (.22 and .24 respectively) there were considered sufficiently independent to warrant separate analysis, given that the inter-relatedness, when explored, only exhibited small effect sizes in terms of inter-relatedness. As such, 2 regression models were constructed which addressed the feared-for and hoped-for enmeshment and proximity data and are presented separately.

### *3.12.3 Checking Assumptions*

As per the assumptions of regression, all variables entered within the model were quantitative with variation in value. To identify multicollinearity correlations between predictor variables, Variance Inflation Factors and Eigen Values were examined, indicating that the assumption of no multicollinearity was met, with correlations above .3 and below .7. The Durbin-Watson statistic was used to ensure the assumption of independent errors was also met. Residuals were normally distributed and the assumption of homoscedasticity was met. Outliers were examined and isolated to identify any interference which could impact upon estimated regression coefficients (e.g., reducing or increasing the regression gradient). One participant was identified as an outlier, with data removed to determine any compromise to the statistical analysis, of which there was little to none, often the case in larger sample sizes. Normality plots and standardised scatterplots of residuals were also examined indicating no major deviations or violations of assumptions. Analysis of variance for each model were also examined and proved statistically significant ( $p < .001$ ) and meaning null hypotheses could be rejected.

3.12.4 Predicting HADS Total with centrality and feared-for enmeshment and proximity  
(Model:  $R^2 = .412$   $AdjR^2 = .377$   $F(5, 86) = 7.69$   $p < .001$ )

**Table 20:** Summary of hierarchical regression for affective distress and perceived age, feared-for self-discrepancy and centrality.

	$\beta$	$sr^2$	$R^2$	$AdjR^2$	FChange	Sig
<i>Block 1</i>			.204	.186	11.16	.001
Pain Severity	.27	.06 <sup>2</sup>				.425
Perceived Age	.02	.03 <sup>2</sup>				.692
<i>Block 2</i>			.412	.377	7.69	.001
Centrality	.40	.31 <sup>2</sup>				.001
Feared-for Proximity	-.09	-.07 <sup>2</sup>				.403
Feared-for Enmeshment	.03	.03 <sup>2</sup>				.729

Upon entering pain severity and perceived age into the regression model (Block 1), a total of 20.4 per cent of the variance was explained (affective distress = poorer adjustment to chronic pain,  $R^2 = .204$ ) and when adjusted for statistical shrinkage, 18.6 per cent of the variance was explained ( $AdjR^2 = .186$ ). Upon entering pain severity, perceived age, centrality, and feared-for proximity and enmeshment into the model (Model 2), this explained 41.2 per cent of the variance ( $R^2 = .412$ ) and when adjusted for statistical shrinkage, 37.7 per cent of the variance was explained ( $AdjR^2 = .377$ ). This is a significantly significant contribution ( $p < .001$ ).

To examine the contribution of each variable, coefficients were examined. Only centrality contributed significantly, whereas feared-for enmeshment and proximity did not reach statistical significance. This data suggests the importance of how central pain becomes to an individual as opposed to how old a person perceives themselves to be, and how close an individual feels to what they fear, and how conditional on the permanence of pain an individuals feared selves are.

3.12.5 Predicting HADS Total with centrality and hoped-for enmeshment and proximity  
(Model:  $R^2 = .531$   $AdjR^2 = .504$   $F(5, 86) = 19.56$   $p < .001$ )

**Table 21:** Summary of hierarchical regression for affective distress and perceived age, hoped-for self-discrepancy and centrality.

	$\beta$	$sr^2$	$R^2$	$AdjR^2$	FChange	Sig
<i>Block 1</i>			.204	.186	11.16	.001
Pain Severity	.27	.06 <sup>2</sup>				.425
Perceived Age	.02	.03 <sup>2</sup>				.692
<i>Block 2</i>			.531	.504	19.56	.001
Centrality	.08	.19 <sup>2</sup>				.013
Hoped-for Proximity	2.88	.38 <sup>2</sup>				.001
Hoped-for Enmeshment	.11	.01 <sup>2</sup>				.899

Upon entering pain severity and perceived age into the model (Block 1), a total of 20.4 per cent of the variance was explained (affective distress = poorer adjustment to chronic pain,  $R^2 = .204$ ) and when adjusted for statistical shrinkage, 18.6 per cent of the variance was explained ( $AdjR^2 = .186$ ). Upon entering pain severity, perceived age, centrality, and hoped-for proximity and enmeshment into the model (Model 2), 53.1 per cent of the variance ( $R^2 = .531$ ) was explained and when adjusted for statistical shrinkage, 50.4 per cent of the variance was explained ( $AdjR^2 = .504$ ). This is a significantly significant contribution ( $p < .001$ ).

To examine the contribution of each variable, coefficients were examined. Centrality and hoped-for proximity contributed significantly, whereas hoped-for enmeshment did not reach statistical significance. This data suggests the importance of how central pain becomes to an individual and how close an individual feels to what they hope to be in the future. However, how enmeshed an individual's hoped-for selves are with pain appears less important for this sample, nor does how old an individual feels themselves to be.

In summary, regression analyses indicate that perceived age does not significantly predict affective distress and pain adjustment in chronic pain. However, what appears important for adjustment to chronic pain is the proximity to what is hoped-for and how central or integral pain becomes with identity. These variables (i.e., centrality and hoped-for proximity) illustrate the importance of pain becoming integral to the self and the value in attaining a sense of closeness to what is important for ourselves.

## CHAPTER FOUR: DISCUSSION

### 4.1 Introduction

The primary aim of this thesis was to investigate if age moderated chronic pain-identity enmeshment and adjustment. Based upon an extensive review of the chronic pain and identity literature, several hypotheses were generated.

First, to explore age in the context of chronic pain, it was hypothesised that older adults would perceive themselves as younger in age compared to younger adults who would perceive themselves as older. Second, it was hypothesised that older perceived ages would be associated with greater enmeshment and centrality. Third, it was hypothesised that perceived age would be more strongly associated with variables of distress and adjustment and identity compromise and would outperform chronological age. Fourth, that perceived age would predict pain adjustment. And fifth, that centrality and enmeshment would inter-relate.

A single group multiple-measures observational design was used to explore the research hypotheses. This design has been successfully used to investigate pain-cohort phenomena and pain-identity compromise (Morley, Davies & Barton, 2005; Sutherland & Morley, 2008; Wells, 2010). 90 participants with OA and chronic pain were recruited from a musculoskeletal service in West Yorkshire. Chronological, perceived age and age disparity were investigated to examine age relationships with pain-adjustment and identity variables. *The Possible Selves Interview* (Hooker & Kaus, 1994) and *The CES* (Berntsen & Rubin, 2006) were used to measure identity enmeshment and pain-identity integration, and to examine their inter-relatedness. Further variables (e.g., affective distress, pain severity, acceptance etc.), noted for their association with pain adjustment, were also measured to control for during subsequent analyses and to validate the sample and the findings generated. Affective distress, considered to be the best predictor of adjustment to chronic pain (Keefe *et al.*, 2004), was used to measure pain adjustment.

This chapter first discusses the construct of age and its relation to identity and adjustment and its predictive value in pain adjustment. This is followed by an exploration of the validity and reliability of the data by comparing findings against existing pain-adjustment and pain-identity literature and an examination of the inter-relatedness of centrality and enmeshment. The chapter concludes with a discussion of the limitations of this research, clinical implications and areas for future research.

### 4.2 Perceived age Vs. Chronological Age

This research examined the disparity between chronological and perceived age by asking participants how old they perceived themselves to be in the context of chronic pain. Age discrepancy was calculated by subtracting chronological age (from the date of interview) from perceived age to identify positive or negative age discrepancies.



It was hypothesised that older individuals with chronic pain would perceive themselves as younger compared to younger adults with chronic pain who would perceive themselves as older. Chronological age and perceived age did not demonstrate a significant relationship. However, age discrepancy evidences a significant relationship with chronological age, illustrating that older adults, on average, demonstrated negative age discrepancies (perceiving themselves as younger) and younger adults demonstrated positive age discrepancies (perceiving themselves as older). These findings support the hypothesis that older individuals with chronic pain perceive themselves to be younger compared with younger adults with chronic pain who perceive themselves as older than their chronological age.

Perceived age and age discrepancy demonstrated a significant positive relationship, indicating greater age discrepancies with higher perceived ages. Chronological age and age discrepancy were significantly negatively related, indicating a trend towards increased positive discrepancies (feeling older than one actually is) for younger adults, and negative discrepancies (feeling younger than their actual age) for older adults with chronic pain. This is consistent with literature which suggests older adults, even in the context of chronic pain, dissociate from their peers and align themselves with younger ages (Montepare & Lachman, 1989; Cleaver & Muller, 2002; Kleinspehn-Ammerlahn *et al.*, 2008; Infurna *et al.*, 2010; Weiss & Lang, 2012) and where younger adults with chronic pain feel prematurely aged (Singer, 1974). However, much of the pain adjustment literature has investigated 'chronological age', ignoring perceived age, which perhaps explains why research has inferred a lack of age differences in pain adjustment (Sorkin *et al.*, 1990; Herr & Mobily, 1993; Corran *et al.*, 1997). Perceived age, however, has been noted to be significantly affected by health variables (Richardson, Ong & Sim, 2006; Hubble & Russell, 2009), and out-performs chronological age in its associations with psychopathology (Westerhof & Barrett, 2005; Kotter-Gruhn *et al.*, 2009; Stephan, Caudroit & Chalabaev, 2011) but this had not been explored in relation to chronic pain and adjustment.

In summary, this data suggests that older adults have lower perceived ages than younger adults with chronic pain who perceive themselves as older and evidence positive age discrepancies.

### **4.3 Age and Adjustment**

It was hypothesised that perceived age would outperform chronological age in terms of its relationships with variables related to chronic pain adjustment. This hypothesis was supported with findings indicating limited significant correlations between chronological age and measures of adjustment, whereas perceived age demonstrated significant relationships with the majority of variables measured by this research study. Findings indicate that the older an individual perceives themselves to be,

the more distressed they feel, the more severe and interfering pain they experience, the less accepting of their pain they are and the more catastrophic they think about their pain.

Although observed data indicated few relationships between chronological age and variables of adjustment, consistent with existing research (Comstock & Helsing, 1976; Eaton & Kessler, 1981; Riley *et al.*, 2000; Weiner *et al.*, 2004; Molton *et al.*, 2008), a significant negative correlation was observed between affective distress and chronological age, with older adults demonstrating less affective disturbance than younger adults. This may be a product of the perceived younger ages of older adults (negative discrepancies) noted in this research and as noted in the literature (Westerhof & Barrett, 2005). Furthermore, as per previous research (Herr & Mobily, 1993; Rustoen *et al.*, 2005), chronological age evidenced a further significant negative correlation with anxiety suggesting reduced anxiety with advancing age, despite a significant positive relationship between chronological age and pain duration (i.e., older people have experienced pain for longer). Additionally, the lack of a relationship between chronological age and pain severity challenges research suggesting that younger adults report greater pain than older adults (Keefe *et al.*, 1996; Weiner & Ruddy, 2002; Jones *et al.*, 2005). However, the reduced affective distress in older adults supports research suggesting that older people under-report pain or report disproportionate pain, and experience less affective distress compared to younger adults (Parmelee, Katz & Lawton, 1991). This may be explained by research suggesting individuals adapt to pain over time (e.g., Timko *et al.*, 1992) or that the development of pain within the later part of the developmental trajectory is experienced as less threatening to identity and is considered normative and concomitant to the aging process (Faircloth *et al.*, 2004; Hopkins, 2004; Richardson, Ong & Sim, 2006). Conversely, younger adults evidencing greater anxiety may be explained by the relatively recent onset of symptoms that do not fit with expected patterns of ontogenesis and provoke greater biographical disruption (Boersma & Linton, 2006).

Perceived age fared better in terms of its correlations with adjustment variables, outperforming chronological age. Perceived age correlated significantly with pain severity, pain intensity and perceived interference, suggesting that an association between higher perceived ages and more severe, intense and interfering pain. Furthermore, perceived age significantly correlated with total affective disturbance, anxiety and depression, indicating greater psychopathology with older perceived ages, confirming research suggesting that the younger adults feel, the greater their psychological, physical and social functioning (Barak & Stern, 1986; Uotinen, Rantanen & Suutama, 2005; Demakakos, Gjonca & Nasroo, 2007; Infurna *et al.*, 2010). Further significant correlations were observed between perceived age and rumination and perceived helplessness indicating greater helplessness and rumination with older perceived ages. In

terms of acceptance, significant correlations were observed between perceived age and total acceptance, activity engagement and pain willingness indicating that with greater perceived age individuals are less willing to experience pain, are less engaged in activity and less accepting of their pain. Therefore, perceived age outperformed chronological age in terms of its associations with pain adjustment as implied by more recent pain research (Westerhof & Barrett, 2005; Kotter-Grühn *et al.*, 2009; Stephan, Caudroit & Chalabaev, 2011).

#### **4.4 Age, Self-Discrepancy and Centrality**

To explore the relationship between age and identity, chronological, perceived age and age discrepancy were examined against feared-for and hoped-for enmeshment and proximity (as per The Self-Discrepancy Model) and centrality (as per *The CES*). Feared-for and hoped-for enmeshment were used to assess the conditionality of what is hoped and feared-for in the future upon the continued presence of pain. Feared-for and hoped-for proximity were used to measure an individual's perception of how close or remote they feel to what they fear and hope-for in the future. Pain-identity integration was measured using *The CES*.

It was hypothesised that individuals perceiving themselves as older than their chronological age would evidence greater hoped-for and feared-for enmeshment, greater proximity to feared-for future selves, a greater remoteness from hoped-for future selves, and greater pain-identity centrality. Findings partly supported this hypothesis. Perceived age evidenced significant correlations with proximity to feared-for and hoped-for future selves and centrality, indicating that with older perceived ages, individuals feel closer to what they fear, feel more distant from what they hope to be in the future with pain perceived as more central to identity. However, perceived age did not evidence any significant correlations with enmeshment. Perceived age evidenced further significant correlations with self-efficacy and expectancy (how capable individuals feel of avoiding what they fear, achieving what they hope for, and how likely they perceive what is feared and hoped-for occurring in the future). These findings indicate that older perceived ages are associated with a greater expectation of what is feared coming true, a reduced expectation of what is hoped-for occurring, and a perceived inability to avoid feared-for selves or attain hoped-for selves. Additionally, age discrepancy demonstrated similar findings to perceived age.

In contrast, chronological age demonstrated no significant relationships with hoped-for and feared-for enmeshment, self-efficacy and expectancy, feared-for proximity, and centrality. However, chronological age did evidence a significant negative relationship with hoped-for proximity suggesting a greater closeness to what is hoped-for with advancing chronological age. These findings support recent research (Donaldson,

2012) suggesting a relationship between chronological age and hoped-for proximity, and indicate the potential resolution of aspirations and life goals in old age (Prohaska *et al.*, 1987; Edwards, 2006).

In summary, data suggests that the older one perceives themselves to be, the greater the centrality of pain to identity, the greater the proximity to what is feared-for in the future, the greater the remoteness from what is hoped-for in the future, and the lesser individuals expect and feel able to achieve what they hope-for and avoid what they fear for in the future. These findings suggest that chronological age seems somewhat irrelevant; moreover, it is age perception that has produced significant and interesting findings validating its use to explore its relationship to adjustment.

#### **4.5 Perceived Age as Predictive of Chronic Pain Adjustment**

The primary aim of this thesis was to investigate whether advancing age was a protective factor against the integration of chronic pain into identity (centrality) and the conditionality of what is hoped and feared being conditional upon the permanence of pain (enmeshment). This was measured by investigating age (chronological and perceived age), identity (e.g., self-discrepancy and centrality), and further variables relevant to adjustment in chronic pain (e.g., affective distress).

Perceived age evidenced no significant predictive quality with regards to chronic pain adjustment as measured using linear regression, meaning that the main hypothesis for the study is rejected. However, findings indicated that centrality and hoped-for proximity instead significantly predicted chronic pain adjustment. Despite perceived age indicating significant relationships with variables of adjustment, when exploring this using regression analysis, perceived age did not contribute significantly to the variance explaining chronic pain adjustment (i.e., affective distress). These findings, therefore, reject the idea that younger people become more pain-enmeshed with pain becoming more central to their identity compared to older people who are less enmeshed and where pain is less central to their identity. The idea of greater biographical disruption in younger chronic pain participants compared to the idea that older individuals expect chronic pain and perceive this a concomitant to old age and therefore less disruptive is not supported. Findings instead promote the idea that any individual, at any time, is susceptible to pain becoming central to their identity and that a perceived remoteness from what individuals hope to be in the future is more important to psychological wellbeing and an individual's sense of self rather than their perceived age. Therefore, this data is congruent with research suggesting limited differences between age-cohorts in terms of pain adjustment (Sorkin *et al.*, 1990; Keefe & Williams, 1990; Herr & Mobily, 1993) and counters the suggestion that cognitive factors are less pertinent for older generations, or that younger people experience greater disruption in the face of chronic pain.

In summary, findings suggest that advancing age, or perceiving oneself as younger in the context of chronic pain, is not protective against pain-identity enmeshment and poor adjustment. How central pain becomes to identity and forms a reference point for future experiences and how remote an individual perceives themselves to be from what they hope-for in the future are more predictive of adjustment and affective distress in chronic pain. This data also challenges recent research which suggests perceived age is a greater predictive variable in health conditions and associated with greater psychological wellbeing and illness adjustment (Westerhof & Barrett, 2005; Kotter-Grühn *et al.*, 2009; Stephan, Caudroit, & Chalabaev, 2011).

#### **4.6 Identity and Adjustment**

To explore the validity of the data generated by this study, findings were compared against existing pain-adjustment research. Correlation data indicated that the research sample evidenced expected relationships between poor adjustment and greater affective distress, reduced acceptance, greater catastrophising, greater pain severity and greater perceived interference. Furthermore, as expected, greater pain-identity enmeshment and centrality also evidenced significant correlations with reduced acceptance, greater affective distress, pain severity and perceived interference and catastrophising. Therefore, the findings of this research are plausible and the measures employed by this research are performing as expected. These research findings (adjustment, centrality and enmeshment) are discussed separately.

##### *4.6.1 Chronic Pain Adjustment*

The mean score of *The HADS* indicated a relatively non-distressed sample, with mean anxiety and depression scores in the non-case clinical range, although the total distress mean score (summation of anxiety and depression scores) fell within borderline clinical case range (Zigmond & Snaith, 1983). Despite the sample demonstrating relative psychological wellbeing, affective distress positively correlated with pain severity and perceived interference, which is consistent with the wider chronic pain literature (e.g., Banks & Kerns, 1996; Romano & Turner, 1985) and suggests that this sample is similar to other chronic pain populations.

Affective distress also evidenced a significant negative relationship with pain acceptance (including activity engagement and pain willingness), indicating an association between affective distress and poorer pain acceptance, less willingness to experience pain and engage in meaningful activity, supporting established pain research (e.g., McCracken & Samuel, 2007). Additional significant relationships were also observed between affective distress and catastrophising, mirroring established research which notes associations between distress and rumination, magnification and perceived

helplessness (Ellis & D'eon, 2002; Sullivan *et al.*, 2001; Lame *et al.*, 2005; Cook, Brawer & Vowles, 2006; Vowles, McCracken & Eccleston, 2008). These findings also confirm existing literature which suggests an association between affective distress and lowered self-efficacy (Dolce, 1987), with significant observed relationships between affective distress and lowered perceived self-efficacy to avoid what is feared and achieve what is hoped-for. Data also corroborate previous findings (e.g., Sullivan & D'eon, 1990) suggesting a lack of a relationship between affective disturbance and pain duration, however, opposing research contends greater depression with longer pain durations (Gureje, Von Korff, Simon & Gater, 1998).

In summary, it appears that the relationships between affect and pain variables investigated by this research (e.g., acceptance, pain severity and interference) are performing as expected and are mostly consistent with the existing pain research literature. The overall low level of affective disturbance in the sample may indicate an overall successfully adjusted sample of participants if affective distress is taken as the main indicator of pain adjustment (Keefe *et al.*, 2004), which may mean that the relationships observed may have proved stronger in a more psychologically distressed sample.

#### 4.6.2 Adjustment and Centrality

Centrality demonstrated significant positive relationships with affective disturbance, pain severity, pain interference, catastrophising, acceptance and perceived control. These findings suggest that the more central pain becomes to identity the more severely pain is experienced, and the more interfering pain is perceived, the greater the impact upon cognitive process (e.g., catastrophising), the less perceived pain control, pain acceptance, activity engagement and willingness to experience pain. However, these relationships could be recursive rather than causal.

These findings confirm Perri & Keefe's (2008) initial research and validate the use of *The CES* with chronic pain patients. Centrality mean scores were similar to Perri & Keefe's (2008) research ( $M = 68.98$ ) indicating similarity between the sampled populations, and suggesting that individuals felt pain had become central to their lives. However, Perri and Keefe (2008) suggested that with greater protracted pain, the potentiality of centrality and affective distress increases, given that research has demonstrated greater disability with longer histories of persistent pain (Grotle, Vollestad, Veierod & Brox, 2004). However, the findings of this research demonstrated no significant relationship between pain duration and centrality. Additional findings of this research demonstrated a significant positive relationship between increased centrality and greater elapsed time since diagnosis ( $\tau = .160, p < .05$ ), meaning that with the passing of time from the receipt of a diagnosis, pain becomes more centralised and integrated into

identity. This might suggest a difference between pain duration and receiving a diagnosis, although one might anticipate greater reactive distress and adjustment difficulty the more recent diagnoses. Moreover, it seems that receiving a diagnosis seemingly helps to facilitate pain-identity integration, which, from the literature, should be associated with reduced maladaptive cognitive, affective distress and fear-avoidance behaviours (Geisser & Roth, 1998). However, this research indicated greater pain severity, greater perceived interference, lesser acceptance and greater anxiety as time elapsed since receiving a diagnosis and greater centrality; relationships which were not repeated with pain duration (Please refer to Table 22). Furthermore, Perri & Keefe (2008) also suggest that increased centrality may lead to a vicious negative cycle of rumination which causes a greater focus upon pain and increases distress. This is confirmed by the findings of this research, where significant correlations were observed between centrality and rumination, magnification and helplessness and anxiety and depression. Geisser and Roth (1998) recommend that patients should be educated with regards to their diagnosis, the origin of their pain and to identify and dispel any maladaptive pain-beliefs. These findings, therefore, may suggest a need to refine the diagnostic process and aftercare for individuals in this sample.

In summary, findings counter Perri & Keefe's (2008) argument that protracted pain promotes greater centrality. These findings suggest that pain duration is potentially less important for centrality in chronic pain. However, the receipt of a diagnosis and how individuals adjust and understand this/these, promotes centrality, which may have negative consequences if individuals remain uninformed about chronic pain conditions and retain maladaptive pain-related beliefs.

In conclusion, it appears that *The CES* is functioning as predicted by Perri and Keefe (2008). However, pain duration failed to evidence any significant relationship with centrality, whereas the elapsed time since diagnosis was positively associated with increased centrality.

#### 4.6.3 *Adjustment and The Feared-for Self*

*The Feared-for Selves Interview* was used within this research to investigate participant enmeshment (the extent to which identity is conditional upon the permanence of pain) and proximity (the perceived distance from what is feared-for in the future, where high scores indicate greater perceived distance from what is feared-for and where low scores indicate a closer perceived proximity to what is feared-for). The abridged version of the interview was used (as per Wells, 2010) and asked participants to select 10 feared-for self characteristics from a reservoir of 25 self-descriptors. These 25 characteristics were generated from an extensive content analysis of previously reported feared-for characteristics by chronic pain populations (Fogg, 2007; Sutherland & Morley, 2008).

Interestingly, as with centrality, pain duration and time since diagnosis were unrelated to feared-for enmeshment, proximity, self-efficacy and perceived expectancy (Please refer to Table 22). This is, perhaps, unsurprisingly given that the literature also notes a lack of a relationship between affective distress and pain duration (e.g., Sullivan & D'eon, 1990) which may also be evident for feared-for enmeshment. However, feared-for enmeshment did correlate significantly with pain severity, perceived pain interference, feared-for proximity, catastrophising and perceived helplessness, depression, reduced perceived control and reduced acceptance; consistent with previous research (e.g., Sutherland & Morley, 2008).

Feared-for proximity scores correlated positively with pain perceived control and acceptance and negatively with pain severity, perceived interference, acceptance, affective distress and catastrophising. These findings suggest that individuals, who see themselves as proximate to what they fear, are more distressed, experience a reduced sense of control, become less accepting of their pain, and become more ruminative, helpless and think catastrophically about their pain. These findings are consistent with Self-Discrepancy Theory and literature which suggests that proximity to what we fear and a distance from our ideal and ought-selves has negative psychological consequences (e.g., Higgins, 1987; Kindermans *et al.*, 2010). This was also supported by the feared-for expectancy scores which measure how likely participants think that what they fear will occur in the future. This data suggests that when individuals perceive a greater likelihood of the feared-selves coming true in the future, they experience more pain, feel older, are more distressed, ruminate more, feel more helpless, think catastrophically, feel less in control and are less accepting of their pain.

In summary, these findings indicate that *The Feared-for Selves Interview* is performing as anticipated and findings are consistent with existing pain-identity literature.

#### 4.6.4 Adjustment and The Hoped-for Self

*The Hoped-for Selves Interview* was used to investigate enmeshment (the extent to which identity is conditional upon the permanence of pain) and proximity (the perceived distance from what is hoped-for in the future, where high scores indicate greater perceived distance from what is hoped-for and where low scores indicate a closer perceived proximity to what is hoped-for). The abridged version of the interview was used (as per Donaldson, 2012) and asked participants to select 10 hoped-for self characteristics from a reservoir of 25 self-descriptors.

Interestingly, as with centrality, pain duration and time since diagnosis were unrelated to hoped-for enmeshment, proximity, self-efficacy and perceived expectancy (Please refer to Table 22). This is, perhaps, unsurprisingly given that the literature also notes a lack of a relationship between affective distress and pain duration (e.g., Sullivan



& D'eon, 1990) which may also be evident for hoped-for enmeshment. Hoped-for enmeshment did correlate significantly with increased affective distress, greater catastrophising and reduced acceptance, providing some consistency with previous pain-identity research (e.g., Higgins, 1987; Sutherland & Morley, 2008). Hoped-for enmeshment did not correlate with pain severity, interference and pain duration. However, this may be explained by the relative psychological wellbeing and the overall low levels of hoped-for enmeshment in the recruited sample. Hoped-for proximity scores correlated positively with pain severity and perceived interference, affective distress, catastrophising, and negatively correlated with acceptance and perceived control. These findings suggest that as individuals achieve a greater remoteness from what they hope-for, they experience more intense and interfering pain, affective distress, become more ruminative, helpless and think more catastrophically about their pain and perceive themselves to have less pain control and are less accepting of their pain and engage less in meaningful activity. These findings are consistent with the Self-Discrepancy Theory and literature which contends that a remoteness from what our ideal and ought-selves hold negative psychological consequences (e.g., Higgins, 1987; Kindermans *et al.*, 2010).

In summary, the observed findings demonstrate some consistency with existing research, suggesting enmeshment with and a remoteness from what is hoped-for in the future is associated with distress and reduced pain acceptance.

#### **4.7 The Inter-relatedness of Centrality and Enmeshment**

It was hypothesised that centrality and enmeshment would inter-relate and evidence measuring the same construct. Centrality and hoped-for and feared-for enmeshment demonstrated significant positive correlations, indicating that with greater centrality individuals demonstrate greater hoped-for and feared-for enmeshment. Further analysis, using the Chi Square statistic, indicated a relationship between hoped-for and feared-for enmeshment, indicating that individuals with high feared-for enmeshment also evidenced high hoped-for enmeshment, consistent with previous research (Morley & Eccleston, 2004; Wells, 2010). However, due to the skewed nature of the feared-for and hoped-for enmeshment data, data was transformed into categories (no enmeshment, and low and high enmeshment) and used to explore their relationship to centrality. Findings indicated significant relationships between high and low centrality and high and no feared-for enmeshment and hoped-for enmeshment, indicating some convergence between the measures, specifically for participants whose feared-for and hoped-for selves were enmeshed and conditional upon the permanence of pain (high feared-for and hoped-for enmeshment) and those whose identity was not (no feared-for and hoped-for enmeshment); the extremes or poles of feared-for and hoped-for enmeshment measures.

*The CES* appears to be good at predicting high and no hoped-for and feared-for enmeshment. However, these findings indicate the lack of sensitivity of *The CES* in identifying those in the process of becoming or developing pain-enmeshed identities (those with low enmeshment). The relatedness of these measures may be moderated by the recency of diagnoses or shorter pain durations limiting pain-enmeshment and centrality. Perhaps controlling for this would have yielded greater convergence between the measures, and that with more time individuals centralise pain as part of their identity and become more enmeshed and more proximate to what they fear and more remote from what they hope-for. However, when explored, findings were non-significant despite a significant positive relationship observed between time since diagnosis and centrality ( $\tau = .160, p < .05$ ).

In summary, findings indicate that an individual may experience a sense of pain becoming 'central' to their identity, however remain un-enmeshed with their pain, meaning that what is feared and what is hoped-for remains possible despite remaining in pain. However, this may be a product of the difference between *The CES* and *The Possible Selves Interviews*, with *The CES* being a 'forced choice' design, versus the questionnaire design of *The Possible Selves Interviews*. Although it was initially thought that *The CES* was measuring self-discrepancy (i.e., enmeshment) it is likely to be measuring something different. Although centrality and high and no enmeshment evidenced significant relationships, effect sizes were small, and likely indicate their independence. Of interest is the greater significant relationship and effect size observed between centrality and feared-for enmeshment, which perhaps indicates a greater inter-relatedness compared with hoped-for enmeshment. This might be explained by the activation of pain related memories and the consideration of the wider impact of pain in *The CES* and content of *The Feared-for Self Interview* (i.e., feared characteristics).

In summary, the hypothesis of centrality and enmeshment relatedness is only partially supported, and it seems that people can become 'enmeshed' but this does not necessarily mean that pain has become central to their identity or vice versa. This might be explained by research suggesting that there are positive consequences to integrating pain or diagnoses into identity (e.g., medical concordance), whereas Perri and Keefe's (2008) only explored the negative aspects associated with centrality, especially since this sample evidenced relative low levels of affective distress. The lack of enmeshment and yet high centrality may be explained by further recent research (e.g., Donaldson, 2012) which suggests that individuals use more accommodative strategies to achieve what is hoped-for in the future and maintain a distance from what is feared-for in the future. Conversely, low centrality and high enmeshment may be explained by the cognitive processes that are involved in admitting to the impact of chronic pain upon identity. Research has noted the protective cognitive processes of adaptive defensiveness

(Coifman, Bonanno, Ray & Grosss, 2007; Smeets *et al.*, 2010), and where the forced choice nature of the enmeshment measures provoke individuals to consider characteristics that are feared and hoped-for, yet does not require individuals to consider the wider impact of pain upon their view of the world.

#### **4.8 Study Limitations**

This research has several limitations which may have impacted upon the validity and reliability of the results generated by this research. This section explores identified limitations in relation to their impact upon the observed findings.

##### *4.8.1 Recruitment and Participants*

Participants were recruited from one pain clinic within the Leeds area, and although recruiting participants from other pain services was considered, this was not possible due to time constraints. As such, differences between sites and/or potential populations could not be explored. However, the recruitment site used offers a locality wide service which is likely to have reduced potential differences (e.g., economic and social strata) which are known to affect pain perception (Kleinman & Kleinman, 1985).

Despite efforts to recruit a sample with a finite diagnosis (i.e., OA), participants evidenced variation in terms of pain site, co-morbid pain conditions and variable pain durations. This may have impacted upon the data generated as, for example, adjustment may differ across such individuals with co-morbidities, who may view further diagnoses as further anticipated evidence of physical health decline (Williams, 2000; Faircloth *et al.*, 2004). Furthermore, the greater number of pain sites and the localised nature of pain may have been more or less disruptive for individuals potentially impacting upon the observed distress and perceived interference of chronic pain.

A total of 116 chronic pain participants were approached by clinicians to take part in the research. However, 26 individuals (22%) were unable to participate. Data regarding these potential participants was not collected due to ethical considerations, meaning that it is difficult to assess the overall representation of the sample compared to the wider chronic pain population. Despite this, efforts were taken to compare research findings with existing pain research literature to validate the sample and findings generated, which proved successful. The relatively low levels of psychological distress, may mean that a relatively well adjusted and 'healthy' sample was recruited and the 26% of individuals who failed to participate may have represented those with greater psychological distress and poorer adjustment which may have had an impact upon the findings generated. However, every effort was made to ensure that recruitment procedure was unbiased, and centrality and affective distress scores compare favorably with existing research (e.g., Perri & Keefe, 2008; Wells, 2010; Donaldson, 2012). Anecdotally, those

participants that failed to take part included individuals who were unable to commit due to work commitments, familial bereavement and a disinterest in the research, rather than evidencing greater distress.

Furthermore, a G Power calculation recommended for large effect size a sample of 90 participants was needed. This was attained and was sufficient to reliably predict significant correlations, and moved beyond Perri and Keefe's (2008) initial study sample.

#### *4.8.2 Demographics*

The majority of participants (n = 72, 80%) were female, which may limit the ability to generalise findings to encompass both genders. However, the dominance of females within pain research is common with females more likely to seek help and engage with services (Moller-Leimkuhler, 2002). Furthermore, the majority of participants were also white British, with ethnic groups under-represented, which may restrict the ability to generalise cross culturally.

Many individuals presented with a variety of different physical health complaints involving pain, with some of these complaints being more established than others. This may impact upon pain adjustment and the ability to retain a sense of self, given that individuals may have already adjusted to established pain conditions unrelated to OA. Furthermore, one might expect that with greater co-morbidity, pain distress and interference would increase, however this was not demonstrated by this research, which perhaps questions the validity of the sample as representative of a normative chronic pain population. However, mean pain duration was comparable to other research investigating identity and pain (e.g., Wells, 2010).

#### *4.8.3 Pain Measures*

*The BPI* was used to measure pain severity and interference. However, research suggests that as participants age their familial and occupational responsibilities reduce. Therefore older participants may have lower levels of perceived interference and such domains as measured by *The BPI* may be less applicable and do not capture a realistic picture of interference in older adults compared to their younger counterparts.

#### *4.8.4 Affect Measures*

*The HADS* was used to assess total affective disturbance, depression and anxiety. Pain-research suggests observable high levels of depression within chronic pain populations (Romano & Turner, 1985; Banks & Kerns, 1996); however, this was not demonstrated by this research. This, perhaps, questions the validity of the sample as being representative of a wider chronic pain population and indicates the particular relative health and pain adjustment of the sample, with perhaps particularly functional individuals having been more likely to engage with this research. This may mean that those with

greater mental health needs and poorer chronic pain adjustment may have been excluded during the recruitment process. Despite this, total distress, depression and anxiety data were comparable with previous research assessing affective disturbance in chronic pain populations (e.g., Wells, 2010; Sutherland, 2004) and every effort was made to ensure that the sampling procedure was unbiased.

#### 4.8.5 Identity Measures

##### 1. *The Possible Selves Interview*

The adapted versions of *The Feared-for* and *Hoped-for Self Interviews* (Wells, 2010) were used to manage participant burden given the large number of measures used in the research in conjunction with literature suggesting participants experience difficulty self-generating feared-for and hoped-for characteristics. The abridged version requires individuals to select up to 10 feared-for and hoped-for characteristics from a reservoir of 25 known to be feared by and hoped-for by chronic pain populations (Morley, Davies & Barton, 2005; Fogg, 2007; Sutherland & Morley, 2008), although participants were able to self-generate if required. The method may promote individuals to choose 10 characteristics rather than the number that are personally relevant. However, the fact that many participants chose less than 10 characteristics suggests that the demand to choose 10 was not strong. Nonetheless, this may be particularly relevant as participants may be more likely to demonstrate greater remoteness from feared-for characteristics that are less personally relevant, and could also influence both self-efficacy and levels of expectancy for less personally relevant characteristics. Furthermore, enmeshment measurement also has the potential to be misinterpreted, given that the calculation is a division of the number of characteristics dependent upon the conditional permanence of pain, meaning that an individual with a single feared-for characteristic and rating this as conditional upon pain will have total enmeshment (i.e., 1) as will an individual choosing significantly more feared-for characteristics and rating these as conditional with pain. This demonstrates that enmeshment does not differentiate the number of characteristics that are chosen, and that the precision of enmeshment is limited by the number of characteristics chosen (i.e., 10).

*The Possible Selves Interviews* ask participants to rate on a 7 point Likert scale how capable they feel (self-efficacy) of preventing or achieving what they fear and hope-for in the future and how likely they think what they fear and hope-for will come true in the future. Wells (2010) notes participants can experience difficulty rating self-efficacy and perceived likelihood on this scale, choosing to rate these at the mid-point of the scale. This research did not observe this, but similar self-efficacy and expectancy ratings to

Wells (2010) were observed, however the limitation of *The Possible Selves Interviews* cannot be fully refuted.

## 2. *Centrality of Event Scale*

Perri and Keefe (2008) note that individuals with more specific pain conditions may evidence less centrality compared to individuals with non-specific diffuse pain (e.g., Fibromyalgia) which is more likely to have a greater impact upon how an individual may understand themselves and their world. This may be applicable to the data collected within this study, as, for example, 14% of individuals within the sample reported having a co-morbid diagnosis of Fibromyalgia.

Authors have suggested that *The CES* does not fully grasp the complex relationship of autobiographically memory “referring to the amount of links between trauma-related and trauma unrelated memories in autobiographical memory” (Smeets *et al.*, 2010 p.216). Recent research has also suggested that *The CES* does not account for individuals who may unconsciously use repression and/or dissociation to avoid the emotional impact of traumatic memories and the effect of negative life events (Smeets *et al.*, 2010). This may also mean that individuals who have recently developed chronic pain may be more traumatized than compared to those with long standing chronic pain durations where there has been greater potential for integration within identity and its impact upon pain beliefs (Grotle *et al.*, 2004), especially since research also indicates the association between catastrophic rumination and PTSD symptoms (Moulds, Kandris, Williams, Lang, Yap & Hoffmeister, 2008). Interestingly, within this research, centrality correlated significantly with rumination suggesting that with greater centrality the greater the rumination of an individual. Despite these potential limitations, mean centrality scores were similar to that of Perri and Keefe’s (2008) initial research with centrality evidencing a greater predictive capacity for pain-adjustment.

### 4.8.6 *Study Design, Causality and Statistical Limitations*

This study employed a single group multiple-measures observational design. This design has been previously successfully used by other studies within the literature to compare chronic pain-age cohort differences (e.g., Riley *et al.*, 2000), however, this design only enables relationships to be identified and explored rather than determining causality. Furthermore, many data were significantly non-normally distributed, meaning that the use of parametric statistical analysis was not possible, in spite of attempting data transformation. In light of this, Kendall’s Tau ( $\tau$ ) was employed. Nonetheless, authors contend that non-parametric tests are as powerful as parametric methods, especially when using smaller samples (Tomkins, 2006). Furthermore, Tomkins (2006) suggests that the

understanding that parametric statistical methods have greater power is a misconception and that analytic methods should be matched to data.

#### *4.8.7 Demand Characteristics*

Research participants can be motivated to ascertain the underlying premise of research and to behave and/or respond in accordance with a researcher's hypotheses. A common problem for research, it is possible that demand characteristics may have affected the outcome of this study; however, aspects of the study related to perceived age were purposefully left until the end of the procedure to reduce the chance that participants would guess that the study was exploring pain adjustment and age. Nevertheless, participants may have been motivated to portray adjustment and wellbeing when being interviewed by a clinical psychologist in training, which could have affected the congruence between a participant's actual mood and level of adjustment and what they presented to the researcher. Furthermore, on reflection, and conversely, several participants discussed their frustration with medical services which may have driven them to express exaggerated difficulties in the context of being interviewed by a NHS professional. However, it is hoped that these confounds were minimized by the anonymity of the research.

Furthermore, despite a high response rate (78%,  $n = 90$ ), the number of individuals who did not participate (22%,  $n = 26$ ) may have yielded more support for the idea that lower perceived age in old age may act as a protective buffer against poor pain adjustment. The literature notes differences between participants who commonly volunteer for research and those that do not. Potentially offering an incentive to take part, or exploring the resistance towards participation may have avoided any recruitment bias, however, this could have been coercive and unethical.

### **4.9 Clinical Implications**

It is well known that chronic pain has a psychological impact, disrupts an individual's sense of biological continuity (Edwards 2006) and self-concept (Morley, 2008). Research suggests elderly stoicism, disproportionate pain reports for diagnoses (e.g., Watkins *et al.*, 2006) and under access and under-referral to mental health services (Harkins 1988; Melding, 1991). This research indicates the difficulties of assuming elderly adaptation and adjustment and using chronological age to assume individual and cohort needs, where centrality and greater proximity or remoteness from what is hoped-for are greater predictors of psychological distress and chronic pain adjustment. However, correlation data did suggest that younger cohorts experience more marked positive age discrepancies and feel prematurely aged, confirming existing literature (e.g., Singer, 1974; Boersma & Linton, 2006) which suggests greater biographical disruption with

unexpected patterns of ontogenesis. However, older people also experience the same disabling effects of chronic pain despite feeling younger.

Overall, the findings of this research point to the importance of identifying distress, examining how integrated pain has become with identity and how proximate individuals feel to what they hope-for, and that chronological age as an indicator of pain adjustment is unreliable. This may have important implications in service design in clinical health psychology, where newer paradigms of ‘ageless’ services are gaining momentum. It will be important to address whether clinical health psychological services follow the same redesign structure as generic adult mental health services, and where age has become arbitrary.

*The CES*, with its origins in PTSD and trauma research, may inform services how best to conceptualize chronic pain; as an insult or trauma that warrants detection and intervention to prevent chronic illness integrating into identity and to facilitate a proximity to what is hoped-for in the face of changing health. There is an indication that to prevent the integration of trauma into identity, emotional regulation is crucial for adaptive responses to negative life events (Smeets *et al.*, 2010), clearly providing a role for psychological or psychologically informed interventions. Given these research findings and the already existing research literature, therapeutic approaches of use include; Acceptance and Commitment Therapy (Hayes, Strosahl & Wilson, 1999), emotion focused work and the use of group formats to facilitate downward social comparisons.

#### *4.9.1 Psychological Interventions*

The pain-adjustment literature recommends cognitive behavioural therapy (e.g., Turner, Holtzman & Mancl, 2007), however the idea of individualised holistic treatment is being promoted and developed (Williams, 2003; Van Koulil *et al.*, 2007). It may be important to address areas of an individual’s biography when considering psychological interventions and integrating this within theoretical or therapeutic frameworks (i.e., consideration of family, carers and social systems, employment etc.). However, research suggests that biographical disruption in chronic pain varies, with authors contending that it should not be universally applied (Fairclough *et al.*, 2004). Nonetheless, where disruption is identified, biographically informed person-centred treatment could aim to mitigate the impact of chronic pain and illness upon identity and promote adapted identities post diagnosis, or maintain pre-illness identities (e.g., to remain in paid work, retain familial roles and engaged with activities of daily living and social activities). These approaches would likely need to be integrated into existing and often dominant medical frameworks which tend to consider conditions in isolation. This may involve working alongside chronic pain teams. Clinical or health psychologists may have an



important role in training medical practitioners to identify distress and to apply psychometric or assessment methods to identify biographical disruption, centrality and client perceptions of remoteness for what is hoped-for in the future. This may involve case consultation and supervision, where necessary, to assist clinicians in managing client distress and adjustment in the face of changing health.

Aside from enquiring about perceived age and applying *The CES* and *The Hoped-for Selves Interview* to assess identity compromise, psychological treatments may facilitate greater adjustment in those feeling disproportionately older than they actually are, experiencing a greater perceived remoteness from what they hope to be in the future, and evidencing an integrated pain identity (i.e., centrality). Identified interventions are now discussed in relation to the findings of this research and the overall adjustment to chronic pain.

#### 4.9.2 Cognitive Behavioural Interventions

Pain identity is considered both positive and negative. Some authors (e.g., Wiebe *et al.*, 2002) contend the usefulness of integrating pain into self-concepts to assist with concordance to medical interventions. However, the conditionality of what is hoped-for and what requires avoidance (e.g., what is feared) and how central pain becomes is amenable to change. Self-perception is a cognitive process, which can be influenced by interventions targeting cognitions, ruminative process, avoidance and pain beliefs (Kerns, Turk, Holzman, Rudy, 1986). Behavioural activation and interventions are also well considered in the literature demonstrating effectiveness for depression (Cuijpers, Van Straten & Warmerdam, 2007). This may be pertinent in chronic pain populations where individuals avoid activity through fear-avoidance (McCracken, 1998, McCracken, Vowles & Eccleston, 2004, McCracken *et al.*, 2005, Viane *et al.*, 2003; McCracken & Samuel, 2007). This was also demonstrated by this research, where higher centrality, enmeshment and proximity were associated with reduced activity engagement and pain willingness. Targeting activity engagement to facilitate the re-engagement with desired social and personal goals and challenging fear-avoidance responses seem important. Furthermore, by conceptualising pain as a trauma, cognitive behavioural therapy could systematically target and modify maladaptive thoughts and beliefs related to the 3 areas of centrality which consider pain as a traumatic life event, with pain becoming: (1) a reference point for everyday inferences; (2) a turning point in the patient's life story; and (3) integrated into a person's personal identity and biography.

If pain is conceptualised as traumatic, disruptive and similar to PTSD, then treatments treating pain in such a way are worthy of consideration. Negative life events that are far removed from the norm produce significant trauma related symptoms, with those unexpected and which deter from previous experience being more likely to become

more central and integrated into identity (Ehlers & Clark, 2000). Further research suggests that more enhanced integration predicts the severity of PTSD symptoms (Berntsen & Rubin, 2007). However, other research has challenged this view suggesting that individuals thrive in the face of adversity (Masten, 2001; Bonanno, 2004) and experience only minor difficulties. Newer research has investigated the cognitive and affective reactivity to stressful trauma finding that these differ between individuals and are associated with rumination (Moulds *et al.*, 2008). In the context of chronic pain, excessive rumination and high centrality may suggest an appropriate point for intervention, given that rumination is predictive of PTSD symptoms (Michael, Halligan, Clark & Ehlers, 2008). This suggests that cognitive and affective reactivity may play a prominent role in the integration of trauma into autobiographical memory (Smeets *et al.*, 2010). Therefore, advocates suggest that high adaptive defensiveness and low anxiety and repressive coping reduce psychopathology and health problems (Coifman *et al.*, 2007; Smeets *et al.*, 2010). This may be important to inform interventions to avoid pathologising defensive strategies and repression in the context of adjustment to chronic pain, which is in contrast to psychological interventions which advocate the exposure to trauma related memories (e.g., Acceptance and Commitment Therapy). Therefore, it will be important to negotiate the provision of treatments with individuals accessing services with clinicians paying keen attention to adaptive psychological defences which may be considered maladaptive in generic mental health.

#### *4.9.3 Acceptance and Commitment Therapy*

Considered a development of traditional CBT, Acceptance and Commitment Therapy (ACT) has been defined as a “psychological intervention based on modern behavioural psychology, including Relational Frame Theory, which applies Mindfulness and acceptance processes, to the creation of psychological flexibility” (Hayes, Luoma, Bond, Masuda & Lillis, 2006). ACT aims to assist individuals to accept pain and thoughts about pain whilst enhancing engagement with meaningful activities and exploring an individual’s attachment to their conceptualised self. This may be especially important given the strong predictive value of hoped-for proximity with chronic pain adjustment and the noted associations between this and acceptance and affective distress. Rather than challenging and redirecting pain thoughts or focusing upon coping, as in CBT, ACT assists individuals to expose themselves to thoughts, behaviours and symptoms which are avoided to defuse inflexible cognitions and clarify values (Dahl, Wilson & Nilsson, 2004). Experiential avoidance may be particularly important in the context of chronic pain, centrality and feared-for proximity, as ACT increases the exposure to memories and thoughts associated with pain to develop a mindful and accepting stance towards stimuli, thoughts and behaviours. Exposure to what is feared, which Higgins (1987) and Self-

Discrepancy Theory and literature indicates is associated with affective distress, may shift a client's emotional and psychological reactions to what they fear-for in the future and when perceiving a remoteness from what they hope-for, and to tolerate this.

Dahl and colleagues (2004) advocate the usefulness of the 'life compass technique'. This involves identifying valued goals, exploring whether existing coping strategies maintain individuals on a current life course or interrupts their biographical flow, and explores barriers which prevent clients maintaining values and goals pertinent to their life course to improve the awareness and explore strategies around these. This may be particularly important for clients experiencing non-normative or unexpected physical health decline, as well as promoting greater proximity to what is hoped-for in the future, which may reduce the centrality of pain in clients.

Recent research has suggested the usefulness of Mindfulness in chronic pain populations, specifically for older adults (Morone, Greco, & Weiner, 2008), demonstrating significant and maintained positive therapeutic change (e.g., reduced pain report, greater pain acceptance and reduced affective distress) adding weight to initial studies by Kabat-Zinn and Lipworth (1985, 1986). Mindfulness aims to promote a non-judging and accepting stance towards stimuli. However, what may also be important from the literature is the participation within a group. Groups have the potential to facilitate downward social comparisons which can mitigate the effects of psychopathology and increase pain acceptance by promoting negative age discrepancies and lower perceived ages (Stephan *et al.*, 2013). Further research studies (e.g., Alexander, Neimeyer, Follete, Moore, & Harter, 1989; Botella & Feixas, 1992) have demonstrated that group participation reduces the sense of being dissimilar to others, which may be particularly pertinent in chronic pain populations who experience a sense of being disbelieved (Kenny, 2004) and strive to maintain a sense of self and connectedness to the world, which may prevent unhelpful pain-identity integration.

Using Mindfulness to promote pain acceptance and emotional regulation is likely to be beneficial and in keeping with PTSD research which suggests adaptive functioning with enhanced switching between cognitive and affective reactivity to trauma (i.e., pain). Mindfulness could be considered a repressive coping strategy, in that the emotional reactivity is noted rather than 'reacted to'. This type of coping has been shown to be associated with lesser PTSD related symptoms, health complaints and maladaptive autobiographical integration (Coifman *et al.*, 2007; Smeets *et al.*, 2010).

ACT has a growing evidence base for physical and psychological problems (Powers, Zum Vorde Sive Vording & Emmelkamp, 2009). In their meta-analytic review, Powers and colleagues (2009) identified ACT as a treatment of choice with maintained therapeutic gains. However, ACT did not outperform other established treatments for psychological difficulties. Nonetheless, for chronic pain, ACT has demonstrated

effectiveness in traditional one-to-one psychotherapy (Dahl, Wilson, Luciano & Hayes, 2005) and self-help (Johnston, Foster, Shennan, Starkey & Johnson, 2010) which may have advantageous cost implications for services.

#### 4.9.4 Clinical Application

The integration of assessment measures at medical consultation, specifically *The CES* and *The Hoped-for Selves Interview* could identify poorer chronic pain adjustment. Such measures require relatively little training to administer or interpret, and could be easily administered. However, given that rumination is the greatest predictor of PTSD, trauma related symptoms and trauma integration into identity (Moulds *et al.*, 2008; Michael, *et al.*, 2007), it may be useful to employ *The PCS*, or similar, to assess this cognitive process and to monitor when pain has become integrated into identity.

Where distress and poor adjustment is identified, providing one-to-one individual therapy would be ideal, however in these austere times this may be naïve. The application of third wave CBT informed therapies and psycho-educative groups or self-help interventions, where downward social comparisons can take place, and which focus upon adaptation and biographical continuity to prevent the development of centralised pain-identities and poor pain adjustment, would be useful. For those with more treatment resistant difficulties, individuals could be referred to specialist services for individual treatment. This would mirror adult mental health psychological services (e.g., Increased Access to Psychological Therapies) following stepped care models, where individuals receive least invasive interventions first. This would require greater interfacing between musculoskeletal teams and clinical health psychology, and more informed chronic pain clinical guidelines to inform service provision.

### 4.10 Future Research

Previous research has delivered mixed messages regarding pain cohort differences, with some authors contending cognitive and perceptual differences are irrelevant in older pain populations (e.g., Rudy, Kerns & Turk, 1988, Turk, Okifuji & Scharff, 1995). However, this research contends that age is arbitrary. More importantly, how centralised pain becomes to an individual's identity and the perceived remoteness from what is hoped-for in the future predicts chronic pain adjustment and affective distress. Given that research has identified that older adults are under-referred and do not access services, it may be useful to explore the perceptions of clinical and medical teams regarding pain and age, to unearth age-cohort biases, which need challenging. As the population ages, it potentially moves away from the age related stoicism inferred by the literature, and suggests care is needed when considering age in relation to chronic pain and adjustment and that this is continually influenced by cultural changes and social

norms which impact upon pain report and perceptions of normative developmental ontogenesis.

Investigating individuals who demonstrate greater centrality and remoteness from their hoped-for selves to explore the conditions which promote centrality and hoped-for remoteness, could inform potential interventions to prevent or reduce this process. It may also warrant identifying at which point pain becomes integrated and when hoped-for selves become perceived as more remote, providing a rationale for timely interventions for individuals experiencing persistent pain, and whether centrality and hoped-for proximity are amenable to change following psychological intervention. Therefore, it may be worthwhile utilising *The CES* and *The Hoped-for Selves Interview* in the context of providing ACT and Mindfulness informed treatments to investigate the process of centrality further, and to determine if this changes.

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## APPENDICES

### Appendix 1: Ethical Approval Letter



## Health Research Authority

### NRES Committee Yorkshire & The Humber - Leeds East

Yorkshire and Humber REC Office  
First Floor, Millside  
Mill Pond Lane  
Meanwood  
Leeds  
LS6 4RA

Telephone: 0113 3050108  
Facsimile:

08 May 2012

Mr Mark Paul Perry  
Psychologist in Clinical Training  
The Leeds Teaching Hospitals NHS Trust  
Leeds Institute of Health Science  
Charles Thackrah Building, 101 Clarendon Road  
Leeds  
LS1 9JL

Dear Mr Perry

**Study Title:** Does age affect the centrality of chronic pain identity?  
**REC reference:** 12/YH/0213

The Research Ethics Committee reviewed the above application at the meeting held on 01 May 2012. Thank you for attending to discuss the study.

#### Documents reviewed

The documents reviewed at the meeting were:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Covering Letter		02 April 2012
Evidence of insurance or indemnity		
Investigator CV		02 April 2012
Letter from Sponsor		02 April 2012
Academic Supervisor CV		
Participant Consent Form	1	02 April 2012
Participant Information Sheet	1	30 March 2012
Protocol		02 April 2012
Questionnaire: Brief Pain Inventory		
REC application		02 April 2012
Referees or other scientific critique report		19 March 2012

#### Provisional opinion

After the Committee's initial discussion, Mr Mark Paul Perry was invited to join the meeting to clarify the following ethical issues, attended to discuss the application.

The Committee queried who will approach potential participants about the study. You



advised that the clinical team will first approach the patients and introduce the study, then you will take consent.

The Committee queried the difference in disease with older and younger patients and whether this would interfere with the results. You advised that he may exclude rheumatoid arthritis and use all patients suffering with Osteo-arthritis.

The Committee queried whether the researcher would be able to recruit the younger population if only Osteo-arthritis patients are used. You advised that you are confident you will be able to recruit patients aged 30+.

The Committee is unable to give an ethical opinion on the basis of the information and documentation received so far. Before confirming its opinion, the Committee requests that you provide the further information set out below.

#### **Further information or clarification required**

1. If the researcher chooses to only include Osteo-arthritis patients, this will need to be included within the exclusion/inclusion criteria.
2. The Participant Information Sheet needs to include that the research has been approved by the Leeds East Research Ethics Committee.
3. The Participant Information Sheet needs to include that any future research will only go ahead if approved by a Research Ethics Committee.
4. The Questionnaire layout needs to be revised with a bigger font used.
5. The Consent form needs to separate whether or not the participant wishes to be included in future research.

The Committee delegated authority to confirm its final opinion on the application to the Chair and Deborah Fox.

The REC nominated the Co-ordinator to be point of contact should further clarification be sought from the application upon receipt of the decision letter.

The REC nominated the Chair to be point of contact for the Co-ordinator if further information was required.

**If you would find it helpful to discuss any of the matters raised above or seek further clarification from a member of the Committee, you are welcome to contact the researcher.**

When submitting your response to the Committee, please send revised documentation where appropriate underlining or otherwise highlighting the changes you have made and giving revised version numbers and dates.

If the committee has asked for clarification or changes to any answers given in the application form, please do not submit a revised copy of the application form; these can be addressed in a covering letter to the REC.

The Committee will confirm the final ethical opinion within a maximum of 60 days from the date of initial receipt of the application, excluding the time taken by you to respond fully to the above points. A response should be submitted by no later than 05 September 2012.

**Membership of the Committee**

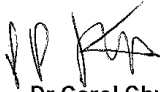
The members of the Committee who were present at the meeting are listed on the attached sheet.

**Statement of compliance**

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

<b>12/YH/0213</b>	<b>Please quote this number on all correspondence</b>
-------------------	---

Yours sincerely



**Dr Carol Chu**  
**Chair**

Email: jade.thorpe@nhs.net

*Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments.*

*Copy to: Mrs Rachel E de Souza*  
*Mrs Anne Gowing, Leeds Teaching Hospital NHS Trust*



## Health Research Authority

### NRES Committee Yorkshire & The Humber - Leeds East

Yorkshire and Humber REC Office  
First Floor, Millside  
Mill Pond Lane  
Meanwood  
Leeds  
LS6 4RA

Telephone: 0113 3050108  
Facsimile:

21 May 2012

Mr Mark Paul Perry  
Psychologist in Clinical Training  
The Leeds Teaching Hospitals NHS Trust  
Leeds Institute of Health Science  
Charles Thackrah Building, 101 Clarendon Road  
Leeds  
LS1 9JL

Dear Mr Perry

**Study title:** Does age affect the centrality of chronic pain identity?  
**REC reference:** 12/YH/0213

Thank you for your letter of 11 May 2012, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

#### Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

#### Ethical review of research sites

##### NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

##### Non-NHS sites

#### Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

A Research Ethics Committee established by the Health Research Authority

## Health Research Authority

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

**It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).**

### Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Covering Letter		02 April 2012
Evidence of insurance or indemnity		
Investigator CV		02 April 2012
Letter from Sponsor		02 April 2012
Other: Academic Supervisor CV		
Participant Consent Form	1	02 April 2012
Participant Consent Form	2	11 May 2012
Participant Information Sheet	1	30 March 2012
Participant Information Sheet	2	11 May 2012
Protocol		02 April 2012
Questionnaire: Brief Pain Inventory	2	11 May 2012
Questionnaire: The Chronic Pain Acceptance Questionnaire	2	11 May 2012
Questionnaire: Feared for selves interview	2	11 May 2012
Questionnaire: Hospital Anxiety and Depression Scale	2	11 May 2012
Questionnaire: Hoped for selves interview	2	11 May 2012
Questionnaire: Centrality of event scale	2	11 May 2012
Questionnaire: Pain Catastrophizing Scale		
Questionnaire: Chronic Pain Acceptance Questionnaire		
Questionnaire: Hospital Anxiety and Depression Scale		
REC application		02 April 2012
Referees or other scientific critique report		19 March 2012
Response to Request for Further Information		11 May 2012

### Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for

A Research Ethics Committee established by the Health Research Authority

## Health Research Authority

Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

### After ethical review

#### Reporting requirements

The attached document "*After ethical review – guidance for researchers*" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

#### Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

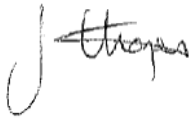
Further information is available at National Research Ethics Service website > After Review

**12/YH/0213**

**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

Pp 

**Dr Carol Chu  
Chair**

Email: jade.thorpe@nhs.net

*Enclosures:* "After ethical review – guidance for researchers"  
*Copy to:* Mrs Rachel E de Souza  
Mrs Anne Gowing, Leeds Teaching Hospital NHS Trust

**Appendix 2: Consent Form**  
**CONSENT FORM (Version 2)**

**“Research into Chronic Pain and Adjustment”**

Chief Investigator: Paul Perry  
Supervisor: Stephen Morley/Jose Closs  
Location: Chapel Allerton Hospital, Leeds  
Rheumatology Department

Please initial  
box to confirm

1. I confirm that I have read and understand the information sheet about this research, and future research. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care being affected.

3. I understand that data collected during the study, may be looked at by individuals from The University of Leeds, from regulatory authorities, or from the NHS Trust. I give permission for these individuals to have access to my data.

4. I agree to my responses to the possible-selves task and subsidiary questions being recorded. I understand that this recording will only be listened to by the chief investigator and his supervisor.

5. I agree to take part in the above **current** research.

6. I agree for some of my data to be used in further research within the Rheumatology Department at Chapel Allerton Hospital, Leeds of which I am receiving treatment (This will only include the Brief Pain Inventory; measuring where I experience pain and a scale of how much pain I experience, and a measure of my mood). I understand that all other data collected within this research will be anonymous and not shared with anyone else.

7. I agree to take part in the above **future** research.

\_\_\_\_\_  
Participant name

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

When completed one consent form (photocopy) will be given to the participant, a further photocopy will be kept by the researcher for administrative purposes and the original to be included within the participant’s medical notes

## **Appendix 3: Patient Information Sheet**

### **PARTICIPANT INFORMATION SHEET (Version 2)**

#### **Research into Chronic Pain and Adjustment.**

##### **Introduction**

You are being invited to take part in a research study about chronic pain. This piece of research is being conducted by Paul Perry, a Psychologist in Clinical Training, as part of his Doctorate in Clinical Psychology at The University of Leeds. This research has been approved by the Leeds East Research Ethics Committee. To conduct this research I need volunteers who experience chronic pain. It is important that you read the following information before making your decision whether to take part. You may discuss this with others if you wish.

##### **What is the purpose of this study?**

The study aims to investigate how integral (or central) a diagnosis of chronic pain can become to a person. I am especially interested in whether this is affected by how old we are, and why this may happen.

##### **What will happen if I decide to take part?**

If you decide to take part in the research, an interview will be organised with you at your convenience; either at the clinic you attend or, if you prefer, your home. The 60-90 minute interview will involve completing some brief questionnaires that ask about your current mood, your experience of pain, how you cope and view yourself, your fears and worries about the future and your hopes and aspirations. Your responses to this part of the interview will be tape recorded. Only the researcher and his academic supervisor will listen to these responses. The researcher will make a written summary of your responses and then the recording will be permanently erased. The written summary will be kept with the other information you provide in a locked cabinet in The University of Leeds as described below.

##### **Do I have to take part?**

No. This is entirely your decision. If you decide to take part you will be able keep this information sheet and will be asked to sign a consent form. If you choose not to, this will not affect your current or future treatment. Furthermore, if you initially agree to take part but then change your mind, you can withdraw from the study at any time. Your withdrawal, at any point, will not affect your current or future treatment.

##### **Who will know about my taking part and what happens to the information?**

A copy of your consent form will be retained in your medical notes so professionals who have access to your medical notes may know of your participation in the study. However, any information obtained will be collected in a private room by the researcher and will be treated with the strictest confidence. The only occasion when confidentiality would be broken and information passed onto a third party, would be if you tell me that you, or somebody else has been harmed or was at risk of harm in some way. For the majority of the data that you provide, this will remain anonymous. This means that your responses will not be shown to, or discussed, with any of the staff at the clinic. The information you provide will be stored in a locked cabinet at the University of Leeds.

##### **Further Research**

The Rheumatology Department at Chapel Allerton Hospital (Leeds) is also conducting research into multiple joint pain. Some of the data collected within this study would be useful for this future research. Again, all data is treated with the strictest confidence and only the research team at the Rheumatology Department will have access to your data

in the future, should you consent to this and if approved by a future Research Ethics Committee. The researcher will explain to you which items of the research will be shared with the Rheumatology team, which will only include a questionnaire about where you experience pain in your body, how much pain you experience and your mood. All other data collected will be anonymised and shared with no one else.

**Can I get further information?**

Yes. If you would like any more information before making your decision, please speak to Paul Perry. I will be at the pain clinic every Thursday and will be happy to discuss the study further with you. You can also call me on (to be arranged). Should I be unavailable, please leave your name and number and I will return your call.

**Thank you**



## Appendix 4: The Chronic Pain Acceptance Questionnaire (CPAQ)

(McCracken, Vowles and Eccleston, 2004)

**Directions:** below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following rating scale to make your choices. For instance, if you believe a statement is ‘Always True,’ you would write a 6 in the blank next to that statement.

0	1	2	3	4	5	6
Never true	Very rarely true	Seldom true	Sometimes true	Often true	Almost always true	Always true
1. I am getting on with the business of living no matter what my level of pain is						___
2. My life is going well, even though I have chronic pain						___
3. It’s OK to experience pain						___
4. I would gladly sacrifice important things in my life to control this pain better						___
5. It’s not necessary for me to control my pain in order to handle my life well						___
6. Although things have changed, I am living a normal life despite my chronic pain						___
7. I need to concentrate on getting rid of my pain						___
8. There are many activities I do when I feel pain						___
9. I lead a full life even though I have chronic pain						___
10. Controlling pain is less important than any other goals in my life						___
11. My thoughts and feelings about pain must change before I can take important steps in my life						___
12. Despite the pain, I am now sticking to a certain course in my life						___
13. Keeping my pain level under control takes first priority whenever I’m doing something						___
14. Before I can make any serious plans, I have to get some control over my pain						___
15. When my pain increases, I can still take care of my responsibilities						___
16. I will have better control over my life if I can control my negative thoughts about pain						___
17. I avoid putting myself in situations where my pain might increase						___
18. My worries and fears about what pain will do to me are true						___
19. It’s a relief to realize that I don’t have to change my pain to get on with my life						___
20. I have to struggle to do things when I have pain						___

## Appendix 5: Hospital Anxiety and Depression Scale (HADS)

(Zigmond, & Snaith, 1983).

This questionnaire is designed to help us know how you feel. Read each item and place a firm tick in the box opposite the reply, which comes closest to how you have been feeling in the past week.

Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response. Tick one box only in each section

1 I feel tense or wound up:		8 I feel as if I am slowed down:	
Most of the time	<input type="checkbox"/>	Nearly all the time	<input type="checkbox"/>
A lot of the time	<input type="checkbox"/>	Very often	<input type="checkbox"/>
Time to time, occasionally	<input type="checkbox"/>	Sometimes	<input type="checkbox"/>
Not at all	<input type="checkbox"/>	Not at all	<input type="checkbox"/>
2 I still enjoy the things I used to enjoy:		9 I get a sort of frightened feeling like "butterflies" in the stomach:	
Definitely as much		Not at all	<input type="checkbox"/>
Not quite so much	<input type="checkbox"/>	Occasionally	<input type="checkbox"/>
Only a little	<input type="checkbox"/>	Quite often	<input type="checkbox"/>
Hardly at all	<input type="checkbox"/>	Very often	<input type="checkbox"/>
3 I get a sort of frightened feeling as if something awful is about to happen:		10 I have lost interest in my appearance:	
Very definitely and quite badly		Definitely	<input type="checkbox"/>
Yes, but not too badly	<input type="checkbox"/>	I don't take so much care as I should	<input type="checkbox"/>
A little, but it doesn't worry me	<input type="checkbox"/>	I may not take quite as much care	<input type="checkbox"/>
Not at all	<input type="checkbox"/>	I take just as much care as ever	<input type="checkbox"/>
4 I can laugh and see the funny side of things:		11 I feel restless as if I have to be on the move:	
As much as I always could	<input type="checkbox"/>	Very much indeed	<input type="checkbox"/>
Not quite so much now	<input type="checkbox"/>	Quite a lot	<input type="checkbox"/>
Definitely not so much now	<input type="checkbox"/>	Not very much	<input type="checkbox"/>
Not at all	<input type="checkbox"/>	Not at all	<input type="checkbox"/>
5 Worrying thoughts go through my mind:		12 I look forward with enjoyment to things:	
A great deal of the time	<input type="checkbox"/>	As much as I ever did	<input type="checkbox"/>
A lot of the time	<input type="checkbox"/>	Rather less than I used to	<input type="checkbox"/>
From time to time but not too often	<input type="checkbox"/>	Definitely less than I used to	<input type="checkbox"/>
Only occasionally	<input type="checkbox"/>	Hardly at all	<input type="checkbox"/>
6 I feel cheerful		13 I get sudden feelings of panic:	
Not at all	<input type="checkbox"/>	Very often indeed	<input type="checkbox"/>
Not often	<input type="checkbox"/>	Quite often	<input type="checkbox"/>
Sometimes	<input type="checkbox"/>	Not very often	<input type="checkbox"/>
Most of the time	<input type="checkbox"/>	Not at all	<input type="checkbox"/>
7 I can sit at ease and feel relaxed:		14 I can enjoy a good book or radio or TV programme:	
Definitely	<input type="checkbox"/>	Often	<input type="checkbox"/>
Usually	<input type="checkbox"/>	Sometimes	<input type="checkbox"/>
Not often	<input type="checkbox"/>	Not often	<input type="checkbox"/>
Not at all	<input type="checkbox"/>	Very seldom	<input type="checkbox"/>

**Appendix 6: The Feared-for Selves Interview**

*(Hooker & Kaus, 1994, adapted by Morley et al, 2005)*

This section is concerned with how you see yourself in the future. We all think about the future to some extent. When we do this we usually think about the kinds of experiences that are in store for us and the kinds of people we might possibly become. We may have images of ourselves that we fear, dread or don't want to happen. Examples of common Feared-for selves are getting divorced, becoming ill, having financial problems or becoming bitter, resentful or unkind. Some of us may have a large number of Feared possible selves in mind, whereas others may have only a few.

You have been given a set of cards. Written on each card is a characteristic that people with chronic pain have told us they might fear becoming in the future. Some of these may apply to you and some may not. There may be other things that you fear for that are not written on the cards. You can add any of your own by writing them on one of the blank cards. I would like you to choose up to ten characteristics that apply to you and put these cards in a separate pile. Let me know when you have finished.

Now that you have identified some of your Feared-for characteristics I am going to ask you two questions about each of these characteristics:

- 1. Is it possible to be like this without pain? Please give a yes or no response
- 2. How close do you currently feel you are to this characteristic?

Please indicate on the scale how close you currently feel to this characteristic.

1	2	3	4	5	6	7
I am just like						I am the complete
This now						opposite to this

E.g. Is it possible to be unkind without pain?

Now, thinking about the Feared-for characteristics you have chosen overall:

- 1. How likely is it that these characteristics will describe you in the future

Please indicate on the scale how likely you feel it is.

- 2. How capable do you feel of preventing these descriptions from becoming true?

Please indicate on the scale how capable you feel of preventing them becoming true.

Feared-for selves	Is it possible to be like this without pain? (yes/no)	How close am I currently to this characteristic? (1-7)
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

How likely is it that these characteristics will describe you in the future? (1-7)

1	2	3	4	5	6	7
Very Unlikely						Very Likely

How capable do you feel of preventing these descriptions coming true? (1-7)

1	2	3	4	5	6	7
Not at all						Definitely

## Appendix 7: The Hoped-for Selves Interview

*(Hooker and Kaus, 1994)*

Now let's think about the future in terms of Hoped-for selves. We may have images of ourselves and what we hope we will be like. Examples of common Hoped-for selves are becoming a parent or grandparent. Some of us may have a large number of Hoped-for possible selves in mind, whereas others may have only a few.

You have been given a set of cards. Written on each card is a characteristic that people with chronic pain have told us they hope to become in the future. Some of these may apply to you and some may not. There may be other things that you hope-for that are not written on the cards. You can add any of your own by writing them on one of the blank cards. I would like you to choose up to ten characteristics that apply to you and put these cards in a separate pile. Let me know when you have finished.

Now that you have identified some of your Hoped-for characteristics I am going to ask you two questions about each of these characteristics:

- 1) Could you be like this in the future if you were still in pain? Please give a yes or no response
- 2) How close do you currently feel you are to this characteristic?

Please indicate on the scale how close you currently feel to this characteristic.

1	2	3	4	5	6	7
I am just like This now						I am the complete opposite to this

Now, thinking about the Hoped-for characteristics you have chosen overall:

- 1) How likely is it that these characteristics will describe you in the future

Please indicate on the scale.

- 2) How capable do you feel of making these characteristics happen in the future?

Please indicate on the scale capable of becoming these you are.

For the characteristics you answered "No I cannot be like this in the future if I were still in pain" can you identify the 3 which are most important to you.

- 1) For each of the 3 characteristics identified ask the participant "Can you think





7. What treatments or medications are you receiving for your pain?

---

---

8. In the last 24 hours, how much relief have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received.

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
No Complete  
Relief Relief

9. Circle the one number that describes how, during the past 24 hours, pain has interfered with your:

**A. General Activity**

0 1 2 3 4 5 6 7 8 9 10  
Does not Completely  
Interfere Interferes

**B. Mood**

0 1 2 3 4 5 6 7 8 9 10  
Does not Completely  
Interfere Interferes

**C. Walking Ability**

0 1 2 3 4 5 6 7 8 9 10  
Does not Completely  
Interfere Interferes

**D. Normal Work (includes both work outside the home and housework)**

0 1 2 3 4 5 6 7 8 9 10  
Does not Completely  
Interfere Interferes

**E. Relations with other people**

0 1 2 3 4 5 6 7 8 9 10  
Does not Completely  
Interfere Interferes

**F. Sleep**

0 1 2 3 4 5 6 7 8 9 10  
Does not Completely  
Interfere Interferes

**G. Enjoyment of life**

0 1 2 3 4 5 6 7 8 9 10  
Does not Completely  
Interfere Interferes

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Pain Research Group  
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## Appendix 9: The Centrality of Event Scale (CES)

Berntsen & Rubin (2006) adapted by Keefe and Perri (2008)

Please think back upon the most stressful or traumatic event in your life and answer the following questions in an honest and sincere way, by circling a number from 1 to 5.

1. This event has become a reference point for the way I understand new experiences.	totally disagree 1 2 3 4 5 totally agree
2. I automatically see connections and similarities between this event and experiences in my present life.	totally disagree 1 2 3 4 5 totally agree
* 3. I feel that this event has become part of my identity.	totally disagree 1 2 3 4 5 totally agree
4. This event can be seen as a symbol or mark of important themes in my life	totally disagree 1 2 3 4 5 totally agree
5. This event is making my life different from the life of most other people.	totally disagree 1 2 3 4 5 totally agree
* 6. This event has become a reference point for the way I understand myself and the world.	totally disagree 1 2 3 4 5 totally agree
7. I believe that people who haven't experienced this type of event think differently than I do.	totally disagree 1 2 3 4 5 totally agree
8. This event tells a lot about who I am.	totally disagree 1 2 3 4 5 totally agree
9. I often see connections and similarities between this event and my current relationships with other people.	totally disagree 1 2 3 4 5 totally agree
*10. I feel that this event has become a central part of my life story.	totally disagree 1 2 3 4 5 totally agree
11. I believe that people who haven't experienced this type of event, have a different way of looking upon themselves than I have.	totally disagree 1 2 3 4 5 totally agree
*12. This event has coloured the way I think and feel about other experiences.	totally disagree 1 2 3 4 5 totally agree
13. This event has become a reference point for the way I look upon my future.	totally disagree 1 2 3 4 5 totally agree
14. If I were to weave a carpet of my life, this event would be in the middle with threads going out to many other experiences.	totally disagree 1 2 3 4 5 totally agree
15. My life story can be divided into two main chapters: one is before and one is after this event happened.	totally disagree 1 2 3 4 5 totally agree
*16. This event permanently changed my life.	totally disagree 1 2 3 4 5 totally agree
*17. I often think about the effects this event will have on my future.	totally disagree 1 2 3 4 5 totally agree
*18. This event was a turning point in my life.	totally disagree 1 2 3 4 5 totally agree
19. If this event had not happened to me, I would be a different person today.	totally disagree 1 2 3 4 5 totally agree
20. When I reflect upon my future, I often think back to this event.	totally disagree 1 2 3 4 5 totally agree

## Appendix 10: Visual Analogue Scales

### VAS: Perceived Control

On average, how would you rate your overall sense of control over your pain?

---

No Control

Complete Control

### VAS: Global Pain Experience

On average, how would you rate your overall pain over the last 7 days?

---

No Pain

Worst Pain

## Appendix 11: The Pain Catastrophising Scale

### Pain Catastrophizing Scale

Sullivan MJL, Bishop S, Pivik J. (1995)



Name: \_\_\_\_\_ Age: \_\_\_\_\_ Gender: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ -----  Male  Female ----- \_\_\_\_\_

Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

**Instructions**

We are interested in the types of thoughts and feelings that you have when you are in pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the following scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

RATING	0	1	2	3	4
MEANING	Not at all	To a slight degree	To a moderate degree	To a great degree	All the time

**When I'm in pain ...**

Number	Statement	Rating
1	I worry all the time about whether the pain will end.	
2	I feel I can't go on.	
3	It's terrible and I think it's never going to get any better	
4	It's awful and I feel that it overwhelms me.	
5	I feel I can't stand it anymore	
6	I become afraid that the pain will get worse.	
7	I keep thinking of other painful events	
8	I anxiously want the pain to go away	
9	I can't seem to keep it out of my mind	
10	I keep thinking about how much it hurts.	
11	I keep thinking about how badly I want the pain to stop	
12	There's nothing I can do to reduce the intensity of the pain	
13	I wonder whether something serious may happen.	

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 Source: Sullivan MJL, Bishop S, Pivik J. The pain catastrophizing scale: development and validation. Psychol Assess, 1995, 7: 524-532

## Appendix 12: Correlation Data

Table 22: Correlation Data

	Mean	Perceived Age	Age Discrepancy	BPI Severity	BPI Interference	Total CES	F-F Proximity	F-F Enmeshment	F-F Expectancy	F-F Efficacy	H-F Proximity	H-F Enmeshment	H-F Expectancy	H-F Efficacy	HADS Total	HADS Anxiety	HADS Depression	PCS Total	PCS Rumination	PCS Magnification	PCS Helplessness	CPAQ Total	CPAQ A/E	CPAQ P/W	VAS Control	VAS Intensity
Age	56.4	.051	-.380**	.048	.048	-.001	.034	.028	-.055	.065	-.172*	-.044	-.016	0.58	-.173*	-.206**	-.192	-.056	-.039	-.108	-.051	.096	.091	.077	-.019	-.071
Perceived Age	56.2		.600**	.435**	.435**	.229**	-.300**	.131	.145	-.272**	.259**	.139	-.230**	-.183*	.218**	.196**	.336**	.252**	.315**	.088	.252**	-.361**	-.221**	-.310**	-.142	.219**
Age Discrep'y	-0.4			.258**	.297**	.187*	-.169*	.079	.159*	-.253**	.349**	.146	-.212**	-.197*	.325**	.325**	.289**	.290**	.224**	.181*	.254**	-.278**	-.237**	-.252**	-.127	.236**
BPI Severity	5.51				.798**	.344**	-.356**	.231**	.263**	-.183*	.296**	.093	-.236**	-.143	.320**	.286**	.382**	.406**	.483**	.288**	.334**	-.461**	-.206*	-.489**	-.200**	.502**
BPI Interference	5.52					.437**	-.509**	.224**	.276**	-.182*	.443**	.139	-.302**	-.212**	.408**	.361**	.524**	.561**	.694**	.378**	.436**	-.679**	-.315**	-.673**	-.331**	.440**
Total CES	70.7						-.427**	.220**	.348**	-.174*	.401**	.239**	-.096	-.123	.401**	.350**	.377**	.410**	.360**	.323**	.350**	-.503**	-.343**	-.468**	-.272**	.309**
F-F Proximity	3.98							-.154*	-.392**	.155*	-.322**	-.245**	.120	.106	-.246**	-.235**	-.220**	-.310**	-.299**	-.236**	-.211**	.361**	-.245**	.326**	.301**	.222**
F-F Enmesh	0.23								.108	-.102	.219**	.310**	-.248**	-.219**	.124	.058	.183*	.172*	.201*	.066	.182*	-.288**	-.190*	-.324**	-.208**	.212**
F-F Expect	4.67									-.362**	.303**	.200*	-.126	-.120	.268**	.244**	.260**	.257**	.226**	.225**	.176*	-.310**	-.237**	-.281**	-.289**	.279**
F-F Efficacy	4.24										-.210**	-.209**	.301**	.425**	-.253**	-.202**	-.292**	-.197**	-.249**	-.182*	-.170*	.245**	.230**	.169*	.175**	-.107
H-F Proximity	3.12											.385**	-.336**	-.309**	.500**	.493**	.403**	.492**	.479**	.294**	.427**	-.503**	-.409**	-.451**	-.336**	.291**
H-F Enmesh	0.32												-.287**	-.303**	.250**	.238**	.219**	.238**	.235**	.086	.225**	-.364**	-.384**	-.247**	-.146	.104
H-F Expectancy	5.06													.571**	-.259**	-.220**	-.257**	-.249**	-.272**	-.204*	-.166*	.238**	.220**	.228**	.210**	-.166*
H-F Efficacy	4.97														-.290**	-.229**	-.311**	-.280**	-.341**	-.231**	-.272**	.273**	.292**	.184*	.161*	-.094
HADS Total	15.7															.770**	.754**	.541**	.479**	.448**	.411**	-.481**	-.328**	-.478**	-.268**	.242**
HADS Anxiety	7.4																.485**	.504**	.455**	.441**	.380**	-.395**	-.261**	-.409**	-.270**	.233**
HADS Dep	7.37																	.467**	.550**	.387**	.343**	-.655**	-.324**	-.618**	-.200**	.220**
PCS Total	21.7																		.729**	.606**	.712**	-.524**	-.340**	-.546**	-.356**	.350**
PCS Rum	7.32																			.520**	.575**	-.689**	-.314**	-.676**	-.384**	.336**
PCS Mag	4.5																				.418**	-.401**	-.190*	-.480**	-.322**	.245**
PCS Help	9.08																					-.442**	-.348**	-.408**	-.352**	.343**
CPAQ Total	64.8																						.656**	.838**	.334**	.305**
CPAQ A/E	40.5																							.299**	.229**	-.111
CPAQ P/W	24.3																								.383**	.392**
VAS Control	4.58																									.228**
VAS Intensity	6.34																									

(Shaded areas represent Persons correlation/un-shaded areas represent Kendall's Tau) \* Significance at the 0.05 level/\*\* significance at the 0.01 level

